

TRANSECT SITES
FOR OIL SPILL STUDY

Dr. G. Chan

	<u>Transect</u> <u>Number</u>	<u>Computer</u> <u>File No.</u>	<u>m² samples</u>	<u>Main species</u>
<u>DUXBURY REEF</u>				
ocean ↑ beach ↓	AT - 1	1 - 1	_____ [2] [1]	TEG, <u>dm² sampling of LIT, BAL</u>
	AT - 2	1 - 2	_____ [2] [1]	TEG, ACM, LIT, BAL, MOP, AEL, PAC, CPP
	AT - 3	1 - 3	_____ [2] [1]	TEG, MOP, PAC, CPP, * for PLA
	AT - 4	1 - 4	_____ [2] [1]	TEG, ACM, LIT, POL, MOP, CPP
	AT - 5	1 - 5	_____ [2] [1]	TEG, ACM, MYT, POL, MOP, * for BAL
	AT - 6	1 - 6	_____ [2] [1]	ACM, LIT, MYT, POL, MOP, * for BAL
	AT - 7	1 - 7	facing cliff [1] [8] [7] [2] [9] [6] [3] [4] [5]	TEG, ACM, MOP AEL, CPP
	AB-8,9,10	1-8,9,10	see berm worksheets	ACM, LIT, POL, AEL, <u>dm² for BAL</u>
	BT - 1	2 - 1	_____ [2] [1]	TEG, BAL, AEL
	BT - 2	2 - 2	_____ [2] [1]	TEG, ACM, LIT, ACA, AEL
	BT - 3	2 - 3	_____ [2] [1]	TEG, ACA, MOP, CPP, * for PLA
	BT - 4	2 - 4	_____ [2] [1]	TEG, ACM, ACA, MOP, AEL
	BT - 5	2 - 5	_____ [2] [1]	ACM, LIT, MYT, POL, STR, <u>dm² for BAL</u>
	BR - 9	2 - 6	2 tidepools	<u>Hermaeina smithii</u> , * others
	BR -10	2 - 7	500 meter ridge	<u>Lottia gigantea</u> , * others
	CT - 1	3 - 1	_____ [2] [1]	TEG, ACM, ACA, MOP, AEL, CPP
	CT - 2	3 - 2	_____ [2] [1]	TEG, ACM, LIT, ACA, MYT, POL, <u>Dm² for MYT in AXA, dm² for BAL</u>
	CT - 4	3 - 3	Mussel Bed	set m, POL.
	CT - 5	3 - 4	Seastar corner	AST
	CT - 6	3 - 5	Scrapped m ²	TEG, ACM, MOP, CPP
	CT - 7	3 - 6	Mushroom rock	TEG, ACM, LIT, ACA, BAL, AEL, CPP
	CT -10	3 - 7	see transect notes	<u>Lottia gigantea</u> only, * others
	CT -11	3 - 8	see transect notes	AXA total count only
	CT -12	3 - 9	sieve	<u>Saccoglossus sp.</u>
	CT-13,14,15	3 -12	Island, Shark rock, Bolinas Pt.	tagged HAL
	SA - 1	4 - 1	Sausalito Seal Statue	<u>Dm² of BAL, PAC, others</u> try to duplicate dm ² plots
	FB - 1	5 - 1	Ft. Baker	<u>Dm² of BAL, others</u>
	SB - 1	6 - 1	Stinson Beach	EME, NEP, ORC, others
	DB - 1	7 - 1	Drakes Beach	EME, NEP, ORC, others (check ORC in Zone 1)
	CR-5,6,7	8 - 1	Chimney Rock subtidal	HAL, STR
	BR-1,2,3	9-1,2,3	Bird Rock transects	many
	BR - 4	9 - 4	Bird Rock subtidal	HAL, STR

Liters to gallons conversion table

Liters	Gallons	Liters	Gallons	Liters	Gallons
1	.3	34	9.0	68	18.0
2	.5	35	9.2	69	18.2
3	.8	36	9.5	70	18.5
4	1.1	37	9.8	71	18.8
5	1.3	38	10.0	72	19.0
6	1.6	39	10.3	73	19.3
7	1.8	40	10.6	74	19.6
8	2.1	41	10.8	75	19.8
9	2.4	42	11.1	76	20.1
10	2.6	43	11.4	77	20.3
11	2.9	44	11.6	78	20.6
12	3.2	45	11.9	79	20.9
13	3.4	46	12.2	80	21.1
14	3.7	47	12.4	81	21.4
15	4.0	48	12.7	82	21.7
16	4.2	49	12.9	83	21.9
17	4.5	50	13.2	84	22.2
18	4.8	51	13.5	85	22.5
19	5.0	52	13.7	86	22.7
20	5.3	53	14.0	87	23.0
21	5.5	54	14.3	88	23.2
22	5.8	55	14.5	89	23.5
23	6.1	56	14.8	90	23.8
24	6.3	57	15.0	91	24.0
25	6.6	58	15.3	92	24.3
26	6.9	59	15.6	93	24.6
27	7.1	60	15.9	94	24.8
28	7.4	61	16.1	95	25.1
29	7.7	62	16.4	96	25.4
30	7.9	63	16.6	97	25.6
31	8.2	64	16.9	98	25.9
32	8.5	65	17.2	99	26.1
33	8.7	66	17.4	100	26.4
		67	17.7		

For more precise conversion
1 liter = .2642 gallons
1 gallon = 3.785 liters

The numbers and kinds of resident plants and animals are of value in determining the basic nature of an environment. If there are many individuals of a few species, conditions are indicated that will favor the presence of organisms having a wide range of tolerance. Under such conditions, the environment is probably eutrophic. A few organisms that include many species indicate an oligotrophic environment. Organisms in oligotrophic environments have narrow ranges of tolerance for many factors.

Oligotrophic environment: These very clear waters are characterized by high stability (that is, narrow ranges of most conditions). They are nutrient poor (low concentrations of nutrient salts) with small but diverse populations of plants and animals.

Mesotrophic environment: These waters are characterized by intermediate values of most factors. Ranges of extremes of these factors fall between the ranges found in oligotrophic and eutrophic classifications. Mesotrophic environments may have characteristics approaching oligotrophic conditions early in the growing season. They may approximate eutrophic conditions late in the growing season in temperate climates.

Eutrophic environment: These usually turbid, nutrient-rich waters are characterized by a general lack of stability (wide ranges of extremes of most factors). Variations exist from one sampling site to another, from one time of day to another, and especially between surface and bottom regions. Plants and animal populations are abundant and composed of a few species of a tolerant nature.

Diversity Index: Generally, in ecological systems, a complex biological community connotes a stable environmental situation. Evaluation of an ecosystem can often be accomplished by measuring the number of species in the biological community. One way of expressing this relationship is Simpson's (1949) Diversity Index.

$$\bar{d} = \frac{(\text{total \#s of organisms})^2}{(\text{total \#, species a})^2 + (\text{\# of b})^2 + (\text{\# of c})^2 + \text{etc.}}$$

OR

$$\bar{d} = \frac{N^2}{\sum (n)^2}$$

This index increases as the numbers of species increase in a population of a given size. A sample of 30 individuals, all the same species, has an index of 1. A sample of 30 that has 3 species (10 individuals each) has an index of 3.0. The diversity index is a biological indication of stability of an environment. A high index (many different species with few numbers) implies a stable, oligotrophic or mesotrophic environment. A low index (few species among many organisms) implies a eutrophic or otherwise unstable environment.

1/18/71
ALL SITES

TIME LOG FOR ALL STUDY SITES for Investigator J. Chan

Year	Date	Location		Trans- sect	General Observations
		Tide, Time	Area, Sect.		
1971	1/18	1:42 AM collision	SFBeg		OK SPILL
	1/19	1:42 AM	SA	100 m	Out of 100 oil covered crabs, 20 were alive
	1/23	-0.8 C 3:18 PM	DX		Survey of reefs R.D. Chronicle & science reporter, David Perlman
	2/9	-0.5 C 5:30 AM	Bolinas		
	2/12	2.1 C 6:24 AM	DX		
	2/23	-1.1 C 4:18 PM	DX	C	
	3/5	-0.2 C 1:30 PM	DX	C	
	3/6	-0.3 C 2:24 PM	DX	C	NSF Institute
	3/20	-0.1 C 12:24 PM	Bolinas		NSF Institute
	3/23	-0.6 C 2:54 PM	DX	C	
	3/25	-0.1 C 4:18 PM	BMS		
	3/30	-0.8 C 8:24 AM	BMS		
	4/1	-0.4 C 10:30 AM	DX	C	
	4/2	-0.2 C 11:42 AM	DX	A,B	
	4/7	0.7 C 3:36 PM	DX	A,B,C	as Dale Stranghan
	4/15	-0.3 C 8:36 AM		B	
	4/16	-0.3 C 9:36 AM	ST		
	4/20	-0.1 C 1:30 PM	DB		
	4/27	-1.5 C 8:06 AM	DX	Begin	
	4/29	-0.9 C 9:54 AM	DX	C	few bright green lobes 20 <i>Potilloides cinetipes</i> and 12 <i>Cancer restornerius</i>
	4/30	-0.5 C 10:54 AM	DX	outside	

TIME LOG FOR ALL STUDY SITES

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Year	Date	Tide, Time	Location Area, Sect.	Trans- sect	General Observations
1971	5/13	-0.9 @ 8:30 AM	SA		
	5/14	-0.9 @ 9:18 AM	BR	subtidal	
	6/10	-1.3 @ 7:30 AM	DX	C	dense catenomorpha on mussels
	6/11	-1.3 @ 8:12 AM	BR	subtidal	
	7/8	—	DX	subtidal CT14	w Cadant stand
	7/9		DX		heavy catenomorpha growth along w catenomorpha
	7/10	-1.2 @	DX	CT-12	ulva in all three areas, over all rocks
	7/20	-1.2 @ 5:12 AM	DX		
	7/21	-1.0 @ 6:36 AM	DX		
	7/23	-0.8 @ 7:12 AM	DX		
	7/19-7/28	week	DX A, B		Oil still seeping into tidepools from the upper berm sands

1/18/71
ALL SITES

TIME LOG FOR ALL STUDY SITES

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Year	Date	Tide, Time	Area, Sect.	Tran- sect	General Observations

○ = oil

Sept, 1971

PROPOSED POST-OIL SPILL STUDY SITES, 1971-72

<u>CODE</u>			<i>number of traverse</i>
SA	SAUSALITO	4-1	1
FB	FORT BAKER SOUTH MUIR BEACH	5-1	1
SB	STINSON BEACH <i>oil graded off</i>	6-1	1
BL	BOLINAS LAGOON	3	
DX	DUXBURY REEF	A = 1-1 through 1-10 B = 2-1 through 2-8 C = 3-1 through 3-11	10 8 11
BP	BOLINAS POINT RCA REEF	5	
DP	DOUBLE POINT	10-1, 10-2	2
	BEAR VALLEY		
DB	DRAKES BEACH	7-1	1
CR	CHIMNEY ROCK	8-1	1
BR	BIRD ROCK	9-1 through 9-4	4
			<hr/> Σ 40

All sites have pre-oil spill data

COMPARATIVE

~~PROPOSED~~ POST-OIL SPILL STUDY SITES, 1971-72

TREATMENT & CONTROL

SAUSALITO (OIL)

Seal Rock

find Bay site with no oil

~~NORTH MILP BEACH~~

STINSON BEACH (OIL) and DRAKES BEACH (NO OIL)
Boyle's sand fence

BOLINAS LAGOON (OIL)

clam beds

DUXBURY REEF ^{residual} (OIL) and (NO OIL) Subtidal also

A
B
C

mid to
high tide

low
tide areas

~~BCA REEF~~

BOLINAS POINT (NO?) Subtidal only

DOUBLE POINT (OIL) Subtidal only

~~BEAR VALLEY~~

DRAKES BEACH (NO OIL) and STINSON BEACH (OIL)
Ranger Station

CHIMNEY ROCK (NO OIL) Subtidal only
abalones, snappers

BIRD ROCK (NO OIL) Subtidal also

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre-Data	Ran-dom?	Organisms
DUXBURY REEF areas A, B, & C	AT-1	barren area	✓	1969	10m ²	alg
	AT-2	Δ 30m from channel	✓	1969	10m ²	alg, trop
	AT-3	flood channel	no	1969	10m ²	alg, trop, Acorn, A. fan
	AT-4	egate channel		1969	10m ²	alg, Acorn, Lotti, Litt, Platyodon
	AT-5	egate channel	✓	1969	10m ²	alg, Lotti, Acorn, trop, Litt
	AT-6	9m x 4m		1969	4m ²	alg, alg
	AT-7	cliff line	✓	1969	9m ²	alg, A. fan, Acorn, Acorn
	AB-8	Burn 1	✓	1964	10m ²	Litt, Acorn, Bal
	AB-9	Burn 2	✓	1964	10m ²	Litt, Acorn, Bal
	AB-10	Burn 3-10	✓	no	10m ²	Litt, Acorn, Bal
	AS-11	stake #1	✓	1962	5m ²	alg, Lotti, alg, A. fan, Acorn
	AS-12	stake #2	✓	1962	2m ²	Acorn, alg, trop
	AS-13	stake #3	✓		2m ²	alg, Acorn, alg
	AT-14	50m from shore		1969	10m ²	Strongylocentrotus, Platyodon
	AT-15	50m from shore		1969	10m ²	Strongylocentrotus, Platyodon
1- 8 9 10 Platy, Urchin + 12	BT-1	25m offshore	✓	1969	10m ²	alg, Bal, A. fan
	BT-2	Δ	✓	1969	10m ²	alg, Acorn, Litt, Acorn, Acorn
	BT-3	channel	no	1969	10m ²	alg, Acorn, Platy
	BT-4	breakwater	no	1969	10m ²	alg, Acorn, alg, trop, A. fan
	BT-5	near	no	1969	10m ²	Acorn, alg, alg, Lotti, trop, Strongy
	BT-6	entrance		1969	9m ²	alg, Acorn, Bal, A. fan
	BT-7	9 transects but BT-5 & BT-6		1970	90m ²	alg, trop
	BR-8	Burn	✓	no		Litt, Acorn, Bal
	BR-9	ridge tidgods	✓	1959	2m ²	Nerminia, onitidis
	BR-10	ridge	✓	1959	500m	Lottia gigantea
	BT-11	10m x 10m	no	1962		Cryptochiton, stelleri
	BT-12	every 50m	no	no	no	Strongylocentrotus, Platyodon
2- 6 7 8 Platy, Urchin	CT-1	island	✓	1969	10m ²	alg, Acorn, Acorn, Acorn, trop
	CT-2	anemone crevice	no	1969	10m ²	alg, alg, A. fan, Bal, Litt
	CT-3	Bed I	✓	1968	10m ²	alg
	CT-4	Bed IV	✓	1965	10m ²	alg, Lotti
	CT-4a	15' x 1' string	✓	1957	3	alg
	CT-5	limestone corner	✓	1969	10m ²	alg, Pissaster, A. fan
	CT-6	scraped patch	✓	1968	1m ²	Acorn, Acorn
	CT-7	mushroom rock	✓	1969	1m ²	alg, Acorn, Bal, Litt, Acorn
	CT-8	long's pool	✓	1970	10m ²	alg, Lotti
	CT-9	near urchins	no	1968	5m ²	Strongylocentrotus
	CT-10	10m x 20m	✓	1968		Lottia gigantea
	CT-11	10m crevice	✓	1968		A. fanthogramma
	CT-12	flood channel	no	1959	five	Paccoglossus sp.
	CT-13	island	no	1967	sub-tidal	Halictes rufescens
3- 10 Platy	CT-14	shack's tooth rock	no	1967	sub-tidal	Halictes rufescens
	Belins Pt. antitidal	AT-15				
	CT-15		no			Strongylocentrotus, Platyodon

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre-Data	Ran-dom?	Organisms
DUXBURY REEF	AT-1	barren area	✓	1969	10m ²	leg
areas A, B, & C	AT-2	Δ 30m ² channel	✓	1969	10m ²	leg, trop
Vetromile, Anderson	AT-3	flood channel	no	1969	10m ²	leg, trop, acan, A. fan
	AT-4	ligament channel		1969	10m ²	leg, acan, Lolli, Litt, Platyodon
	AT-5	agate island	✓	1969	10m ²	myt, Lolli, acan, trop, Litt
Dager, Kuchessa	AT-6	9m x 4m		1969	4m ²	myt, leg
Vetromile, Anderson	AT-7	cliff line	✓	1969	9m ²	leg, A. fan, acan, scabra
Biere, Smith	AB-8	Berm 1	✓	1964	10m ²	Litt, acan, Bal
Melton, Mykethick	AB-9	Berm 2	✓	1964	10m ²	Litt, acan, Bal
Peck	AB-10	Berm 3-10	✓	no	10m ²	Litt, acan, Bal
	AS-11	stake #1	✓	1962	5m ²	myt, Lolli, leg, A. de fcm app.
	AS-12	stake #2	✓	1962	2m ²	acan app, trop
	AS-13	stake #3	✓		2m ²	myt, acan app
Ziegler	AT-14	very 50m		1969	m ²	Strongylocentrotus pur, Platyodon
Troubridge	BT-1	25m offshore	✓	1969	10m ²	leg, Bal, Anole
Freis	BT-2	Δ	✓	1969	10m ²	leg, acan, Litt, acan, scabra
	BT-3	channel	no	1969	10m ²	leg, acan, Platy
	BT-4	mesatall	no	1969	10m ²	leg, acan app, trop, A. de
	BT-5	mesa	no	1969	10m ²	acan app, myt, Lolli, trop, Strongylo
	BT-6	entrance		1969	9m ²	leg, acan, Bal, A. de
	BT-7	9 transects but BT3 & BT4		1970	90m ²	leg, trop
	BB-8	Berm	✓	no		Litt, acan, Bal
Muesel	BR-9	ridge tidgods	✓	1959	2m ²	Nermines orithia
	BR-10	ridge	✓	1959	500m	Littia gigantea
Ziegler	BT-11	10m x 10m	no	1962		Cryptochiton, stelleri
	SBT-12	every 50m		no	m ²	Strongylocentrotus, Platyodon
Gelbaum	CT-1	island	✓	1969	10m ²	leg, acan, acan, scabra, trop
Ball	CT-2	anemone crevice	no	1969	10m ²	leg, myt, A. fan, Bal, Litt
	CT-3	Bed I	✓	1968	10m ²	myt
Mearles Wright	CT-4	Bed IV	✓	1965	10m ²	myt, Lolli
	CT-4a	15' x 1' string	✓	1957	3	myt
Ignacio, Stanzel	CT-5	limestone corner	✓	1969	10m ²	myt, Pissaster, A. fan
Gelbaum	CT-6	scraped patch	✓	1968	1m ²	acan, scabra
	CT-7	mushroom rock	✓	1969	1m ²	leg, acan, Bal, Litt, acan, se
	CT-8	10m x 2m pool	✓	1970	10m ²	myt, Lolli
	CT-9	sea urchins	no	1968	5m ²	Strongylocentrotus
	CT-10	10m x 20m	✓	1968		Littia gigantea
Ball	CT-11	10m crevice	✓	1968		A. fanthogramma
Chan	CT-12	flood channel	no	1959	five	Picroglossus sp.
	CT-13	island	no	1967	sub-tidal	Halictis rufescens
Chan	CT-14	shark's tooth rock	no	1967	sub-tidal	Halictis rufescens

POST-OIL SPILL STUDY SITES, 1971-72

4-1 and 5-1

Location	Area	Type of Transect	Oil?	Pre-Data	Ran-dom?	Organisms
SAUSALITO rocky intertidal	Seal Rock 4-1	SA-1 10m ² transect ≥ 6 dm ² samples in each m ² Total of 63 dm ² samples	✓	no	no	<i>Balanus glandula</i> <i>Polydora</i> few <i>Littorina</i> and <i>Acmaea</i>
		dd transect demolished by grading, etc.		✓		
	Seal Rock Block 5-1	FB-1 SA-2 10m ² transect 5 dm ² samples in each control transect to compare w SA-1	no	no	no	<i>Balanus</i> C

STB
6-1

[illegible]

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre- Data	Ran- dom?	Organisms
STINSON BEACH <i>* oil covered, top 6" sand was graded off before first post-oil spill count.</i>	Boyle's sand fence	SB-1 total of 10 m ² samples, one m ² sample every tenth meter mea- surement (90 m transect)	✓ on 1/12/71 *	1965	no	<i>Emerita analoga</i> <i>Orchestoidea californica</i> <i>Dephys californica</i> pine: <i>Crago nigromaculata</i>

1/18/71

INDIVIDUAL SITE

DB

TIME LOG FOR STUDY SITE DRAKES BEACH
location

Year	Date	Tide, Time	Area, Sect.	Tran- sect	General Observations
1970					stretch of 30 x 10 yds = <i>Eugonius mucronata</i> 1500 count of 1500 in one dm ³ sample
1971	1/18				OIL SPILL
1971	4/20	-0.3e 1:30 PM	Ranger station 140°SE	DB-1 DB-2	No sign of <i>Eugonius mucronata</i> 121 <i>Eneidea androsa</i> ♂ and ♀

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre-Data	Ran-dom?	Organisms
DRAKES BEACH	DB-1	Total of 10 m ² taken at diff intervals along 30 m	no	1970	no	<i>Emerita analoga</i> <i>Dephtys carolinensis</i> <i>Amphiterosia gozota</i> <i>Archaeomys maculata</i>
	DB-2	range of count linear and square inch & average	no	no	yes	<i>Balanus crenatus</i>

1/18/71
INDIVIDUAL SITE
CR

Year	Date	Tide, Time	Area, Sect.	Tran- sect	General Observations

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre- Data	Ran- dom?	Organisms
CHIMNEY ROCK	CR-1	subtidal				
	CR-2					

Year	Date	Tide, Time	Area, Sect.	Tran- sect	General Observations

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre- Data	Ran- dom?	Organisms
BEAR VALLEY						
BIRD ROCK	BR-1	subtidal	no			
	BR-2					

10-1
10-2

DP

DOUBLE POINT

Year	Date	Tide, Time	Area, Sect.	Tran- sect	General Observations

10-1
10-2

POST-OIL SPILL STUDY SITES, 1971-72

Location	Area	Type of Transect	Oil?	Pre- Data	Ran- dom?	Organisms
DOUBLE POINT	DP-1	subtidal				

D
X

Area
A

AT-1
pk

A hand-drawn map of a coastal area. The map shows a coastline with a bay. Inside the bay, there are labels: "focus pelvetia" at the top, "barren ridges" in the middle, and "mossy green" at the bottom. A horizontal line with arrows at both ends is labeled "2m". To the right of this line, there is a small box containing the numbers "2" and "1". At the bottom right, there is a label: "(Raflesia pitiora) anchored on rock".

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

Year Date Tide/Time Water temp. Other

[illegible]

AT-2

A hand-drawn map of a coastal area. At the top, a horizontal line is labeled "ocean". Below this line, a "flood channel" is depicted. To the right of the channel, a diagonal line is labeled "1 foot deep". Below the channel, a "crevice" is marked. To the left of the crevice, a vertical dashed line is labeled "4 1/2 meters". Below the crevice, a "large pool" is indicated. At the bottom, a horizontal line is labeled "water". To the right of the water line, a small rectangular area is labeled "edge of pool".

Investigator _____

Year 1971 Date 4/2 Tide/Time 11:42 AM Water temp. 10.2 C Other

Year 1954 Date Apr Tide/Time _____ Water temp. _____ Other _____

[illegible]

1-3
AT-3
~~AT-3~~
p7

Ocean

Transect AT-3 Type 10 m²

Transect AT-3 Type 10 m²

Other 10 m line, bird alone

at school. I

A hand-drawn diagram illustrating a flood channel and its drainage system. At the top, a horizontal line represents the 'flood channel'. Below it, a vertical arrow points down to a horizontal line, with the text '35 meters' written next to the arrow. To the right of this line is a box containing the numbers '21' and an arrow pointing right. Below the horizontal line, there is a wavy line representing a 'beach'. Below the beach, there is a dashed line representing a 'drain pipe'. The area between the beach and the drain pipe is labeled 'triangle island'. At the bottom, the text 'channel, leveled this area' is written.

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

[illegible][illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-4

Study Site DUXBURY REEF

Area A Section A Channel

Transect AT-4 Type 10m²

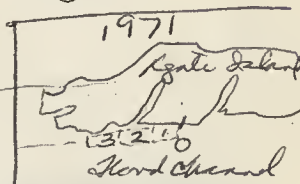
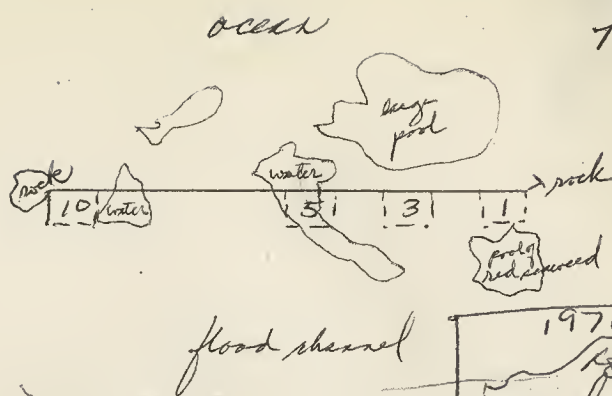
Other flood channel area

Agate Island; line laid across

service tower back of island

Reference

Investigator



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 8/9 Tide/Time -0.20 11:30 AM Water temp. 12°C Other Air 9.5°C

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)								
			<i>Tegula</i>			<i>Arca</i>			<i>Scapharca</i>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		creat ridge <i>Gastropoda</i>	10		48"	3			1		
2		<i>Lidia</i> + <i>Alia</i>	8			2			0		
3		"	2		1"	6			0		
4		"	5			3			2		
5		"	2			1			1		
6		+ <i>Microvelia</i>	2			1			2		
7		+ <i>Spergonomys</i>	5			2			0		
8		<i>Lidia</i> + <i>Alia</i>	1			1			0		
9		"	0			2			0		
10		"	2			3			1		
			37			24			7		

Year 1971 Date 11/16 Tide/Time 4:00 Water temp. 18°C Other clear

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)								
			<i>Popanus</i> sp			<i>Scapharca</i> sp			<i>Leptasterias</i>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	0	<i>Gigartina</i> + <i>Alia</i>	6	3		1	2		1		
2		(heavy)	3	2		2	1				
3		"	1	4		1	0				
4		"	2	1		0	0				
5		"	8	6		2	0				
6		"	4	1		1	5				
7		<i>Gastropoda</i>	1	7		1	4				
8		"	1	5		2	2				
9	0	"	2	8		3	1				
10		"	3	2		2	6				

6/30/12
Clear
Water 15°C
Air 20°C

No TEG

me

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-4

P2

Study Site AT-4
Area A Section Channel
Transect Type
Other

Reference

Investigator

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 71 Date 11/16 Tide/Time Water temp. Other 1 Lepastoria

		Organism Count		Size=Avg. mm.		(S=shells with oil)	
Species=		Hermit crabs		Scarbesia diva			
Plot #	Oil? Algae, other	Live	Dead	Size	Live	Dead	Size
1	0 Gigartina cristata heavy.	10			1		
2	0	3			2		
3		1			1		
4		2			0		
5		8			2		
6		4			1		
7	Castroclonium	1			1		
8		1			2		
9		2			3		
10		3			1		

Not Gula.

Year 1972 Date 1/14 Tide/Time 0.9 24:33 Water temp. Other

		Organism Count		Size=Avg. mm.		(S=shells with oil)	
Species=		Pinnaria		Dumetia		Agathidium	
Plot #	Oil? Algae, other	Live	Dead	Size	Live	Dead	Size
1	0 Gigartina 37g	4			2		
2	0	5			2		
3	heavy	14			1		
4		2			1		
5		1			2		
6		5			2		
7		1			1		
8		6			1		
9		3			1		
10		3			1		

Other {2 Ctenopoma 3" 5" 1 Pseudosquilla 7"

inc

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-4

p3

Study Site Duckberry

Area AT Section 4 Channel

Transect 7 Type

Other

Reference

Investigator Jim Elliott

Scott Bradley

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1972 Date 4-30 Tide/Time 0.5 9:30 Water temp. Other

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)											
			Zoa			Acum			Litt			Pol		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			2			0			0			0		
2			2	2		0			0			0		
3			3			0			0			0		
4			6			0			0			0		
5			1	1		1			0			0		
6			2	1		0			1			0		
7			0			0			0			0		
8			1	1		1	1		1			0		
9			1			0			0			0		
10			0			1	1		1			0		
Total			18	5		3	1		3			0		

Year Date Tide/Time Water temp. Other

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)											
			MOP			P. purpurea								
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			0			0								
2			0			0								
3			0			1								
4			0			3								
5			0			3								
6			0			2								
7			0			1								
8			0			2								
9			0			1								
10			0			0								
Total			0			13								

broken

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	(8/1)			#1	- 20ty 1 mop 6 dem section
				#2	2 myt 10ty - 20 dem section 5 poly
				#3	- 23ty 1 mop
				#4	30 myt 8 poly
				#5	2 myt 16ty 20 dem section
				#6	- 21ty 20 dem section
				#7	30 myt 10 dem section 2 poly
				#8	2 myt 15ty 6 dem section
				#9	2 myt 3ty 10 dem section 40 poly
				#10	14 myt 30 poly
			Total	366	82 myt 108ty 2 mop, 10 dem 18 cent 70 dem 56 poly
1971	1/23	-0.8 3:18 PM	gobules OIL COVERED TRANSECT	#1	20 myt 0 ty 0 mop 1 dem 9 Poly
				#2	101 myt - - 5
				#3	2 myt - 2 mop 3 15
				#4	4 myt 1ty 5 mop 5 -
				#5	- - 2 mop - -
				#6	- - 2 mop - -
				#7	2 myt - 1 mop 3 2
				#8	1 myt - - - -
				#9	- - 1 mop - -
				#10	- - 1 mop - -
			Total	176	130 myt 1ty 14 mop 17 dem 33 poly
1971	4/2	-0.2 11:42 AM	gobules OIL 1" myt COVERED 1 1/2" myt 12 noon oil on some organisms, some rot	#1	24 myt 0 ty 1 mop 1 A 2 dem 45 ty
				#2	105 - 4 - 1 - 15
				#3	1 - 2 1 {3" 1 A - 1 straggly
				#4	- - 4 3 2 A - -
				#5	- - 3 - - -
				#6	- - {2" 1 A - -
				#7	1 - 2 - {2" 1 A - 1 straggly
				#8	1 - 1 - 3 A - -
				#9	- - 1 - - -
				#10	- - 4 - - -
			Total	365	135 myt 4 ty 25 mop 5 A 17 dem 180 Poly 1 straggly

Study Site DOXBURY REEF

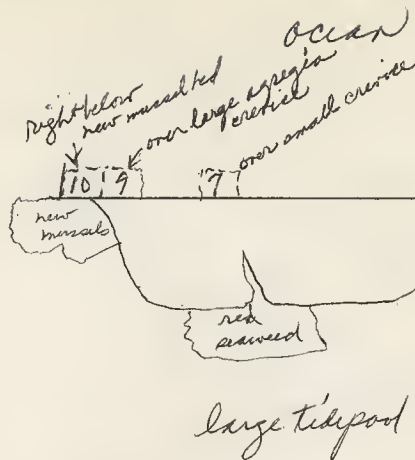
Area A Section Channel

Transect AT-5 Type 10m²

Other old mussel bed, line laid
parallel to shore, across old bed
to present bed

Reference _____

Investigator _____



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 1/23 Tide/Time -0.8°C 3:18 PM Water temp. _____ Other _____

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)											
			<i>Mytilus californianus</i>			<i>Polluciopterus polymorphus</i>			<i>Tagula funebralis</i>			<i>Mytilus pusillus</i>		
		Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	globular	Acacia	20			9			0			0		
2			5	101		7			0			0		
3			3	2		15			1			2		
4			5	4		0			0			5		
5			0	0		0			0			2		
6			0	0		0			0			2		
7			3	2		2			0			1		
8			0	1		0			0			0		
9			0	0		0			0			1		
10			0	0		0			0			1		
Σ196			17	130		33			1			14		

Year 1971 Date 4/2 Tide/Time -0.2°C 11:42 AM Water temp. _____ Other _____

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)											
			<i>Mytilus californianus</i>			<i>Polluciopterus polymorphus</i>			<i>Tagula funebralis</i>			<i>Mytilus pusillus</i>		
		Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	globular	Acacia	24		25mm	45						1		
2			0	108	139mm	135						4		
3	struggle	3 acacia	1			0						2		
4		2 acacia	0			0						4		
5		0	0			0						3		
6		0	0			0						3		
7		2 acacia	0			0						2		
8		2 acacia	1			0						1		
9		3 acacia	1			0						1		
10		0	0			0						4		
Σ365		3 acacia 5	17	135		180			0			25		

below hatched
 over larger epigen crin
 over crin
 ocean
 AT-5
 p2
 small bed
 of muds
 10 9 7 11
 hatched
 muds
 red
 pebbles
 large tide pool

Species=			Organism Count			Size= Avg. mm.			(S=shells with oil)					
Plot #	Oil?	Algae, other	Mytilus			Teg			Acorn			Podicipes		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
		Other Mop												
1	+	1 Leptasterias / pusilla	19			2			31			154		
2	N	2 Lept 3 1/4 mm	98			4			23			138		
3	+	2	0			0			15			0		
4	+	1 Kithira 8 mm	0			2			12			0		
5	+	6	0			1			38			0		
6	+	Bal 8	0			0			28			0		
7	+	2	0			0			17			0		
8	+	1 Lept 2	0			1			18			0		
9	+	1	0			1			18			0		
10	+	1 Pis 6 1/4 Bal 1	0			0			20					
Σ 673		54 4 Lept 1 Pis 1 Kithira	27			11			220			292		

7/22

5mm

Bal acm oth

m²1-2 +++ ~~10~~ 17 1 Mop 35mm
 4 +++ 20, 22D 1 1 Tonicella
 6 + 0, 24, 25D 5 1 Lix. plan
 10 +++ 12, 38D 10 3 Lix. plan

32, 578D 33D 4 Lix. plan
 (2455) 1 Mop
 1 Lix.
 1 Tonicella

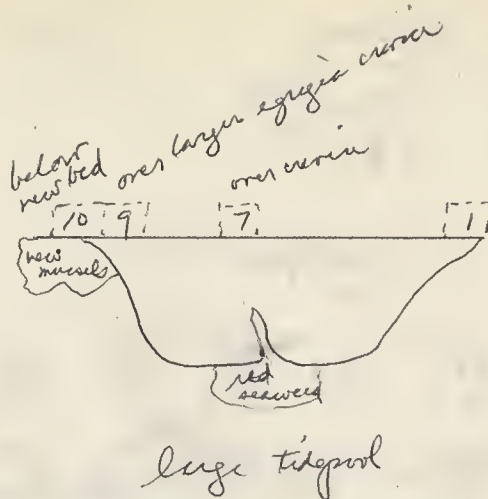
m²3-2 Bal acm
 39, 1D 7
 4 +++ 51, 72D 12
 4 + 29, 118D 6
 10 + 26, 44D 11 1 L. acut
 145, 235D 36 1 L. acut

m²4-2 ~~11~~ Bal cresting high, acm
 4 + Phil. m. 2 1 Lix.
 6 + 31 Bal (16D) on 1 Mop 5
 10 ~~11~~ 21 Bal (7D) on 1 Mop 15 2 Lix. 6mm
 2 Tonicella

4 2 3 4
 1 2 3 4
 1 2 3 4

dim² pattern
 1 2 3 4
 12 13 14 5
 11 16 15 6
 10 9 8 7

Study Site DOXBURY REEF
Area A Section Channel
Transect AT-5 Type 10m²
Other old mussel bed, line
 laid parallel to shore,
 across old bed to new bed
Reference
Investigator



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 1/16 Tide/Time 4:00 Water temp 18°C Other clear

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)											
			Mytilus			Pallidipes			Acan spp			Mopalia		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	+	Corallina (heavy)	26	0	1 1/2"	64			47	0		2		
2	+		120	0	2"	41			53			5		
3	++	} also Lalfais + Pithon	0			0			23			2		
4	++								15			2		
5	++								71			1		
6	++								14			1		
7	++								12			1		
8	++	(240D Eukemus)							22					
9	++	+ Endodolium							26					
10	0	+ Euk + Diodon	0			0			8					

Year 1972 Date 6/30 Tide/Time Water temp. Other

FULL m² of BAL ★

Plot #	Oil?	Species=	Organism Count Size=Avg. mm. (S=shells with oil)											
			MYTILUS			PALLIDIPES			ACANAEA			MOPALIA		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	0.12	ANY TEG?	12			82			50			4		
2	0	BAL	125			146			122			2		
3			2			0			95			2		
4						1			52			1		
5		ulv. Corallina							66			3		
6									39			1		
7									45			2		
8									100			1		
9									84			0		
10									21			0		

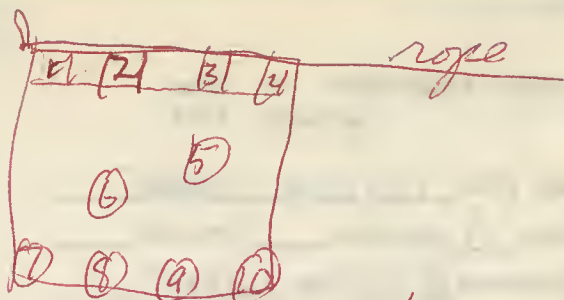
★ of Bal extremely numerous, 10 den² in each m², note dead especially

Vme

Balances

4 small in
all 1-2 mm

DM²



m ²	near mixed bed				coralline covered					
	1	2	3	4	5	6	7	8	9	10
1	89L 4D	75L 2D	180L 4D	52L	102L 1D	23L	6L	4L	3L	4L
2	54L 1D	350L 8D	1200L 10D	670L 12D	54L 1D	2L	3L	1L	0L	0L
3	290L 6D	89L 1D	45L 1D	120L 8D	0	10L	0	0	0	0
4	200L 5D	28L 1D	30L 2D	25L	0	Coralline + ultra coverage				
5	22L 1D	68L 1D	20L	5L	12L	0	0	0	0	0
6	88L 2D	15L 10D	117L 10D	155L 16D	120L 28D	0	0	0	0	0
7	77L 5D	211L 23D	15L 6D	88L 2D	20L 25D	0	0	0	0	0
8	55L 3D	510L 6D	406L 2D	70L 3D	7L 2D	108L 11D	0	0	0	0
9	96L 2D	102L 6D	22L 1D	110L 6D	0	0	0	0	0	0
10	77L 6D	12L 1D	5L	3L	0	3L 4D	0	0	0	0

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-5

p4

Study Site AT-5
Area A Section Channel
Transect Type
Other

Reference

Investigator

Mytilus growing thick in AT-6 = looks healthy!

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 11/16/71 Tide/Time Water temp. 18°C Other Clear weather

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			<i>Mytilus</i>			<i>Pollicipes</i>			<i>Acanthopagrus</i>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
✓ 1	+	Coralina (heavy)	26	0	1 1/2"	64			47	0	
✓ 2	+	" + heavy with	120	0	2 1/2"	41			53		
3	++	" Ralfia							23		
4	++	" + P. lora							15		
5	++	No Tegula nor Littorina							71		
6	++	few Tegula in other deep pool							14		
7	++								12		
8	+								22		
9	+	+ Eucloadia							26		
10	+	+ Linder							8		

Year 1972 Date 1/14 Tide/Time 4:37 PM Water temp. Other 3:00 PM clear

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			<i>Mytilus</i>			<i>Pollicipes</i>			<i>Acanthopagrus</i>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
✓ 1	0	Coralina (heavy)	26			64			47	0	
✓ 2	+	" only	93			80	half over small		53		
3	+	" only							28		
4	+	" Ralfia							16		
5	+	2 TEGS	1						20		
6	+								31		
7	+	"							12		
8	+	"							15		
9	+	Endo							20		
10	+	"							8		

1 thing's me

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-5
p5

Study Site Dusbury

Area AT Section 5 Channel —

Transect X Type 10 dm²/m² for

Other BAC only,

fuel m² for other

Reference —

Investigator Jim Elliott, Scott Bradley

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 72 Date 4/19 Tide/Time 10:30-26 Water temp. — Other —

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)								
			*Ba1 <u>Σ 10 dm²</u> Po1			Tea			Acm		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			224	5		41	—		1	—	avg
2			120			191	—		0	—	
3			261	8		11	—		2	—	avg
4			187			0	—		0	—	
5			207	9		0	—		0	—	avg
6			223			0	—		0	—	
7			364			0	—		0	—	
8			292			0	—		0	—	
9			208			0	—		0	—	avg
10			115			0	—		0	—	avg
Total			2201	24		243			4		56

Year — Date — Tide/Time — Water temp. — Other —

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)								
			Myt			MOP					
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			15	0	avg	0	0	—			
2			82	0	avg	0	0	—			
3			0	0	—	3	0	avg			
4			3	0	avg	0	0	—			
5			0	0	—	2	0	avg			
6			0	0	—	0	0	—			
7			0	0	—	1	0	avg			
8			0	0	—	2	0	avg			
9			0	0	—	1	0	avg			
10			0	0	—	3	0	avg			
Total			100			12					

drake

1-5
AT-5
p 6

Ocean

211

beach

Reference

Investigator _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

			Organism Count Size= Avg. mm. (S=shells with oil)																	
Species=			Live			Dead			Live			Dead			Live			Dead		
Plot #	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size			

[illegible]

7/22

12 3 4
12 13 14 5
11 16 15 6
10 9 8 7

	Bal	acn	
m ² / 2	100	17	1 map
4	20, 250	1	1 test plan
6	0, 245 DS	5	1 this
10	12, 380	10	3 test plan
	326, 5180	33 acn	
	(245)		

	Bal		
m ² 3-2 N	39, 10	7	
4	51, 720	12	
6	29, 1180	6	
10	26, 440	11	1 test out
	145, 2350	36 acn	

	Bal	acn	
m ² 4-2 + Balcoating	100	2	1 this
4	31 Bal (160) m (myt)	5	
6	21 Bal (70) m (myt)	15	2 this
10	!	7	2 mi
		22	

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-6

p2

Study Site Dunbury

Area AT Section 6 Channel

Transect x Type 10 dm²/m² for B&L only

Other fuel m² for others

Reference

Investigator Jim Elliott, Scott

Bradley

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 72 Date 4/19 Tide/Time 06 10:30 Water temp. Other

Plot #	Oil?	Species= Algae, other	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			* Ba	1	10 dm ²	POL			? A.C.M.		L.H.
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			229			183			31		
2			359			233			14		
3			246			185			24		
4			442			295			13		
5			570	33		326			6		
6			424	25		409			12		
7			271	50		146			7		
8			320	18		296			10		
9			137	6		25			5		
10			223	6		0			8		
total			3221	138		2098			130		

Year Date Tide/Time Water temp. Other

Plot #	Oil?	Species= Algae, other	Organism Count			Size= Avg. mm.			(S=shells with oil)		
			MOP			MVT					
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1			0			318	12	avg			
2			0			547	7	"			
3			0			355	0	"			
4			0			627	16	"			
5			0			218	0	"			
6			0			284	0	"			
7			0			138	3	"			
8			3		avg	12	0	"			
9			1		sm	0	0	"			
10			1		sm	0	0	"			
total			5			2499	38				

me

1-7
AT-7
ypb

Hand-drawn sketch of a cliff face. At the top, the text "narrow indentation" is written with an arrow pointing down to a narrow gap in the cliff line. To the right, the word "cliff" is written. Below the narrow gap, the text "slight ridge" is written with an arrow pointing to a small bump on the cliff face. In the center, there is a 3x3 grid containing the numbers 1, 8, 7 in the top row; 2, 9, 6 in the middle row; and 3, 4, 5 in the bottom row. An arrow points down from the bottom of the cliff face.

1	8	7
2	9	6
3	4	5

↓
deep

index 4 feet high. 00

Reference 1

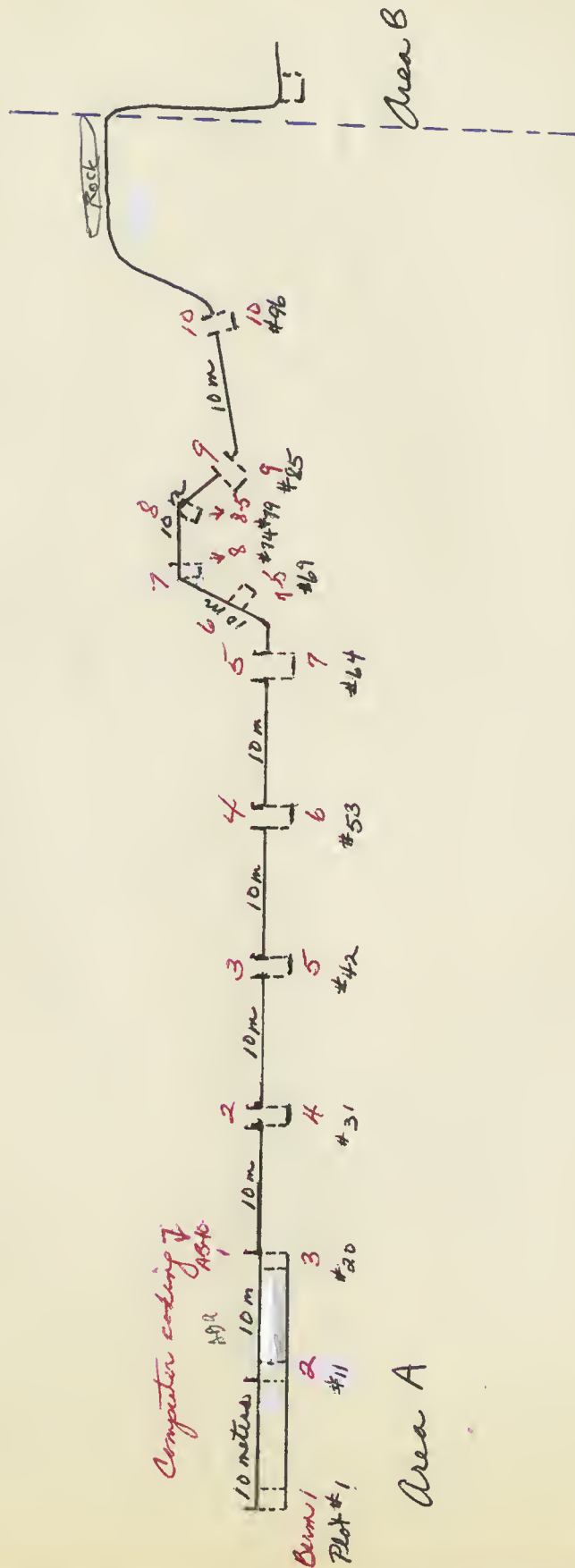
Investigator _____

Year Date Tide/Time Water temp. Other

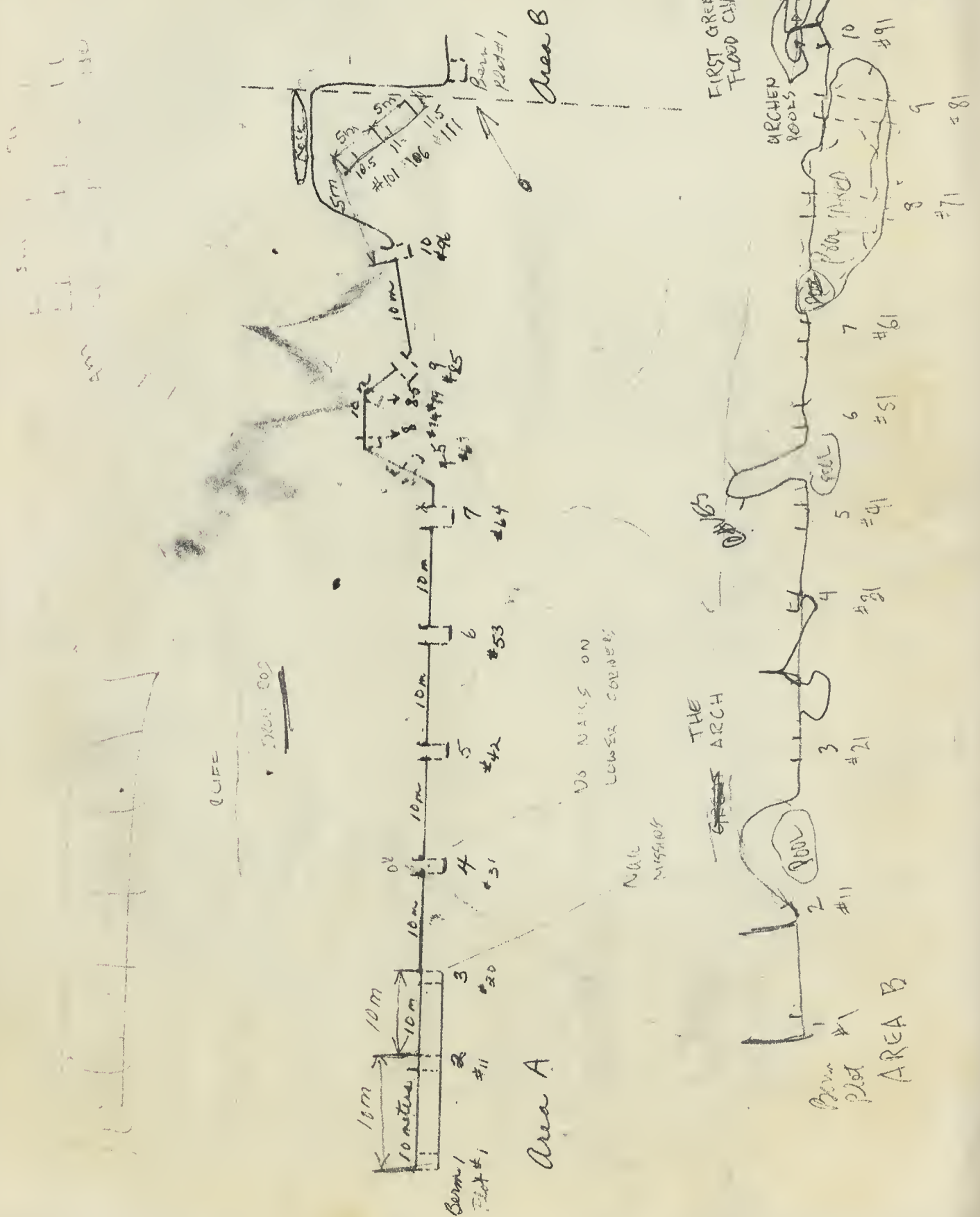
Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

			Organism Count Size= Avg. mm. (S=shells with oil)																	
Species=			Live			Dead			Live			Dead			Live			Dead		
Plot #	Oil?	Algae, other	Count	Size	Avg.	Count	Size	Avg.	Count	Size	Avg.	Count	Size	Avg.	Count	Size	Avg.			

Location of Area A square meter sample plots
High Tide Burns 1 through 10
Duxbury Reef



Location of Area A square meter sample plots
 High 7. to Burns through
 Ruppert Reef



AB-10

Berm 3A

Location:

 Area A Section 3 Plot # 20

 Other 26 m SE of plot 20 of Berm 2

Log:

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.5 8:06 AM	oil deposits as shown; number dead includes acraea
2.				
3.				
4.				


 Memo count only: S = shells covered with oil; ~~S~~S = shells with oil, on top of oil

 N~~S~~ = shells with no oil, on top of oil

 Place in parentheses (no. of shells covered w oil-S, no. of shells on top of oil-S~~S~~, N~~S~~)

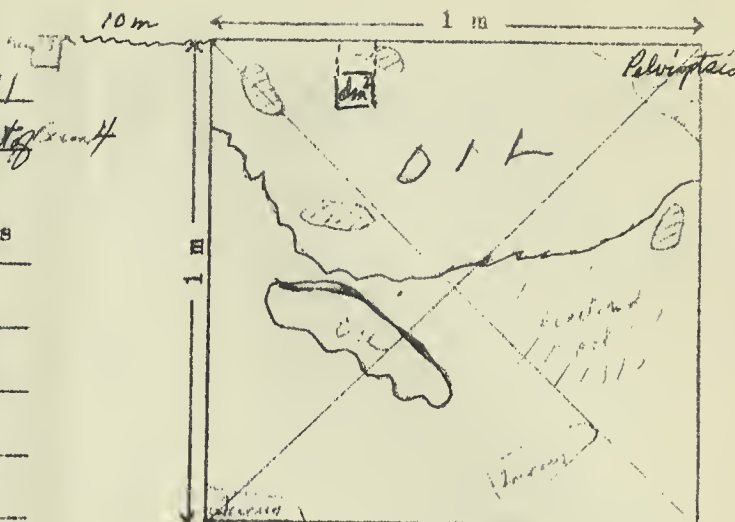
CATEGORY	Acmaea digitalis Total (S - S S) N S	Acmaea scabra Total (S - S S) N S	Littorina scutulata Total (S - S S) N S	Balanus glandula Total (S ₂ - S S) ONE DM ² N S	Other organisms, Changes in oil residue, algal growth, etc.
1. Live	47 (8S-0)	4 (2S-0)	401 (0-40NT)	15	
Dead	23 (23S)	0	18 (18S)	267 (267S)	
Total-m ²	70 (31S-0)	4 (2S-0)	419 (18S-40NT)	282 (267S)	
\bar{X} size and range	10 mm mm.	10 mm mm.	4 mm mm.	4 mm width mm.	
2. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	

Location:

Area A Section Berm 4 Plot# 31Other 10m between end of Section 3 and start of Section 4

Log:

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.5 8:06 AM	oil
2.				
3.				
4.				



Memo count only: S = shells covered with oil; ~~S~~₂ = shells with oil, on top of oil
~~N~~₂ = shells with no oil, on top of oil

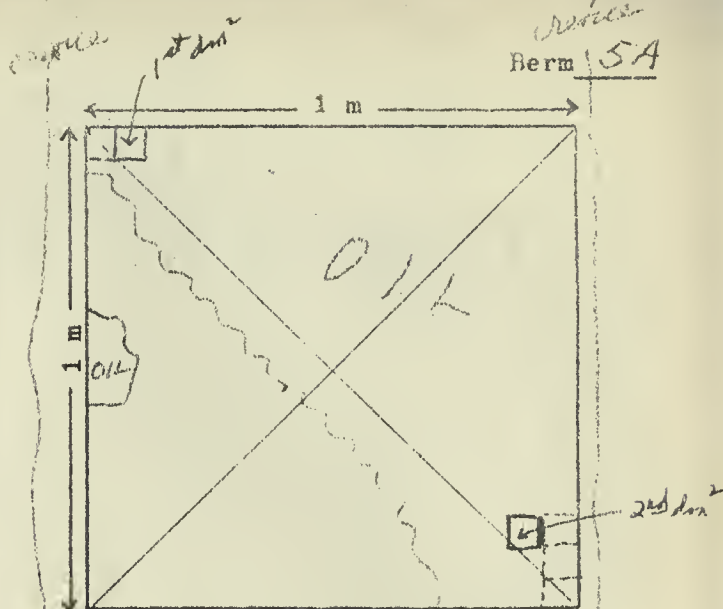
Place in parentheses (no. of shells covered w oil-S, no. of shells on top of oil=~~S~~₂, ~~N~~₂)

CATEGORY	<u>Acmaea digitalis</u> Total (S - S ₂) N ₂	<u>Acmaea scabra</u> Total (S - S ₂) N ₂	<u>Littorina scutulata</u> Total (S - S ₂) N ₂	<u>Balanus glandula</u> Total (S ₂ - S ₂) ONE DM ₂ N ₂	Other organisms, Changes in oil resi- due, algal growth, etc.
1. Live	160 (125-1NT)	10 (0-0)	783 (0-68NT)	8	
Dead	31 (31S)	0	86 (86S)	83 (83S)	
Total-m ²	191	10	869	91	
\bar{X} size and range	13 mm. mm.	13 mm. mm.	4 mm. mm.	4 mm. mm.	
2. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	
3. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	
4. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	

Location:

Area A Section 5 Plot# 12Other 10m between end of Berm and start of
Bermlog: part of m² plot in CREVICE

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.5 8:00 AM	OIL
2.				
3.				
4.				

Memo count only: S = shells covered with oil; ~~S₂~~ = shells with oil, on top of oil~~N₂~~ = shells with no oil, on top of oilPlace in parentheses (no. of shells covered w oil-S, no. of shells on top of oil-~~N₂~~ ^{ST, NT})

CATEGORY	<u>Acmaea</u> <u>digitalis</u> Total (S - S₂) N ₂	<u>Acmaea</u> <u>scabra</u> Total (S - S₂) N ₂	<u>Littorina</u> <u>scutulata</u> Total (S - S₂) N ₂	<u>Balanus</u> <u>glandula</u> Total (S ₂ - S₂) ONE DM ² N ₂	Other organisms, Changes in oil resi- due, algal growth, etc.
1. Live	16 (25-0)	6 (25-0)	219 (0-8 NT)	ONE DM² N₂ 0 2	
Dead	12 (125)	3 (35)	25 (25)	12 + 58 = (705)	
Total-m ²	28 (145-0)	9 (55-0)	244 (255-8 NT)	12 + 66 = 72 m ²	
\bar{X} size and range	13 mm mm.	5 mm mm.	3 mm mm.	3 mm mm.	
2. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	

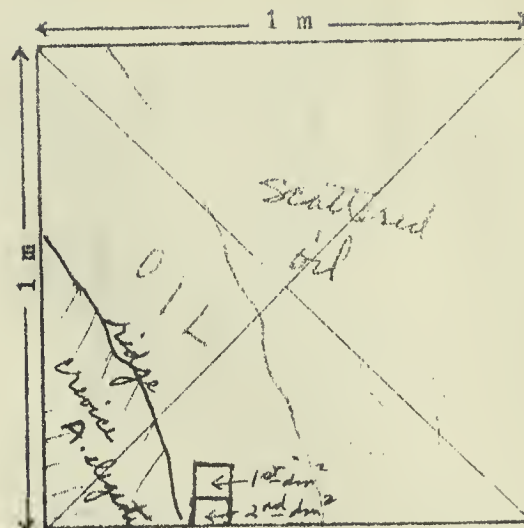
Location:

 Area A Section 6 Plot 53

 Other 10 m from end of Berm 5 to West
Blank

Log:

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/27	-1.5 2:06 A.M.	OIL
2.				
3.				
4.				


 Memo count only: S = shells covered with oil; ~~SS~~ = shells with oil, on top of oil
 NT = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil-S, no. of shells on top of oil-SS, NT)

CATEGORY	<u>Acmaea</u> <u>digitalis</u> Total (S - SS) NT	<u>Acmaea</u> <u>scabra</u> Total (S - SS) NT	<u>Littorina</u> <u>scutulata</u> Total (S - SS) NT	<u>Balanus</u> <u>glandula</u> Total (S ₂ - SS) ONE DM NT	Other organisms, Changes in oil resi- due, algal growth, etc
1. Live	62 (55-0)	4 (0-0)	148 (0-14NT)	3 12-15	5 healthy A. digitalis in lower left corner
Dead	2 (25)	0	14 (14S)	621 75+137S	young, 1/4" ventral side (19mm)
Total-m ²	64 (75-0)	4 (0-0)	162 (14S-14NT)	65 + 87 = 152	
\bar{x} size and range	13mm mm.	19mm mm.	3mm mm.	2mm 1mm very small mm.	
2. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	

Location:

 Area A Section Berm 7 Plot 64

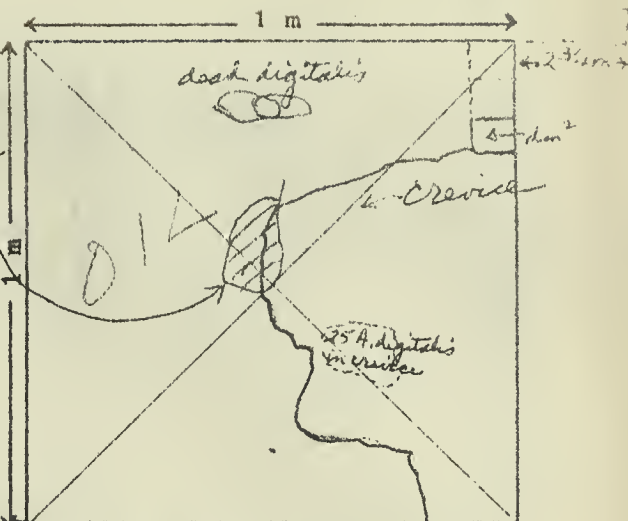
 Other 10 m from end of Berm 6 and

 Log: End of Berm 7 is 2 3/4 m from corner

Year	Date	Tide, Time	Other Conditions
1. 1971	4/28	-1.2 8:00 AM	oil rounded pear sorted
2.			
3.			
4.			

 Enteromorpha
intertextalis

16'


 Memo count only: S = shells covered with oil; ~~SS~~ = shells with oil, on top of oil
 NT = shells with no oil, on top of oil

 Place in parentheses (no. of shells covered w oil=S, no. of shells on top of oil=~~SS~~, NT)

CATEGORY	Acmaea digitalis Total (S - SS) NT	Acmaea scabra Total (S - SS) NT	Littorina scutulata Total (S - SS) NT	Balanus glandula Total (S - SS) ONE DM ² NT	Other organisms, Changes in oil resi- due, algal growth, etc.
1. Live	36 (55-0)	210 (0)	104 (0-23NT)	100	Life of Chlorella on 1/2 m from end of Berm 7
Dead	26 (26S)	2 (2S)	12 (12S)	4 (3S)	
Total-m ²	62 (26S-0)	4 (2S-0)	116 (12S-23NT)	104 (3S)	P. massigera, just 1, in crevice, 25 mm diameter
\bar{x} size and range	13 mm. mm.	13 mm. mm.	3 mm. mm.	3 mm. mm.	
2. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	
3. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	
4. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm. mm.	mm. mm.	mm. mm.	mm. mm.	

DUXICHY BERM WORKSHEET - G. Chan

Berm
7

tidepool

Berm 7-5A

Location:

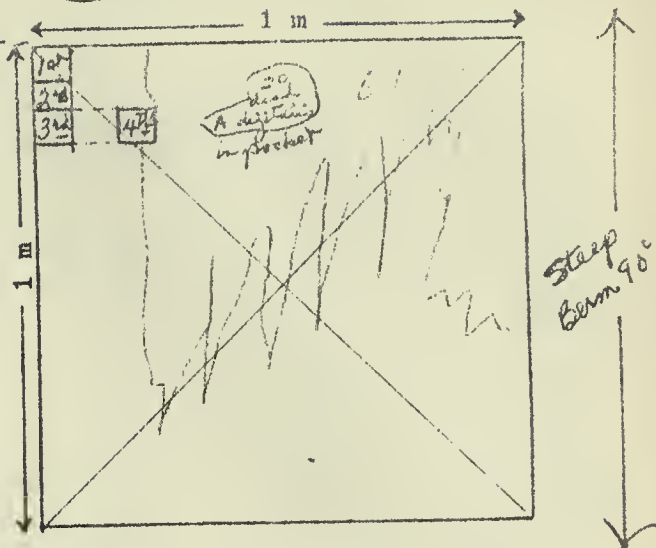
Area A Section Berm 75 Plot # 19

Other 5th square meter plot from end of berm 7

Log:

four 1m² samples for B. fundulus

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.2 8:00 AM	OIL
2.				
3.				
4.				



Memo count only: S = shells covered with oil; ~~SS~~ = shells with oil, on top of oil
~~NS~~ = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil = S, no. of shells on top of oil = ~~SS~~, ~~NS~~)

CATEGORY	<u>Acmaea digitalis</u> Total (S - SS) NT	<u>Acmaea scabra</u> Total (S - SS) NT	<u>Littorina scutulata</u> Total (S - SS) NT	<u>Balanus glandula</u> Total (S - SS) NT	Other organisms, Changes in oil residue, algal growth, etc.
1. Live	44 (45 - 0)	4	85	ONE DM ² NT	Telson of chelodipthera
Dead	97 (918)	1	32 (425)	85 11 140 61	4 th den = 4NT
Total - m ²	141 (1015 - 0)	5 (0 - 0)	117 (325 - 0)	65 175 140 61	of the 131 den = 4NT
\bar{X} size and range	13 mm 7 mm - 19 mm	13 mm	7 mm 3 mm - 8 mm	3 mm	of the 67 den = 19N as noted in den
2. Live					48S died from oil
Dead					
Total - m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total - m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total - m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	

Location:

Area A Section Berm 8 Plot# 74Other 10th seaward meter from end of Berm 7Log: plot begins at corner of core

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.2 9:06 AM	CIL
2.				
3.				
4.				



Memo count only: S = shells covered with oil; ~~S~~ = shells with oil, on top of oil
 N = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil-S, no. of shells on top of oil=~~SS~~, ~~N~~)

CATEGORY	<u>Acmaea</u> <u>digitalis</u> Total (S - S) N	<u>Acmaea</u> <u>scabra</u> Total (S - S) N	<u>Littorina</u> <u>scutulata</u> Total (S - S) N	<u>Balanus</u> <u>glandula</u> Total (S ₂ - S) ONE DM ₂ N	Other organisms, Changes in oil resi- due, algal growth, etc.
1. Live	0	0	6	38	film of algal growth
Dead	7 (7S)	0	10 (10S)	1N (oil)	
Total-m ²	7 (7S)	0	16 (16S)		
\bar{x} size and range	13mm mm.	mm.	7mm mm.	3mm mm.	
2. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	

Location:

Area A Section Berm 8-5 Plot # 19

Other 5th power water plot from end of Berm 8

Log:

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/29	-1.5 8:00 AM	NO OIL except a few 1" apertures
2.				
3.				
4.				

face border back in under berm



Memo count only: S = shells covered with oil; S₂ = shells with oil, on top of oil
N₂ = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil=S, no. of shells on top of oil=S₂, N₂)

CATEGORY	<u>Acmaea digitalis</u> Total (S - S ₂) N ₂	<u>Acmaea scabra</u> Total (S - S ₂) N ₂	<u>Littorina scutulata</u> Total (S - S ₂) N ₂	<u>Balanus glandula</u> Total (S ₂ - S ₂) ONE DM N ₂	Other organisms, Changes in oil resi- due, algal growth, etc.
1. Live	127		468	168	Some pithon on 4th in year leptoderm. NAKS SPRALED
Dead	0		0	0	
Total-m ²	127		468	168	
\bar{X} size and range	16mm mm.		3mm mm.	2mm mm.	
2. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	

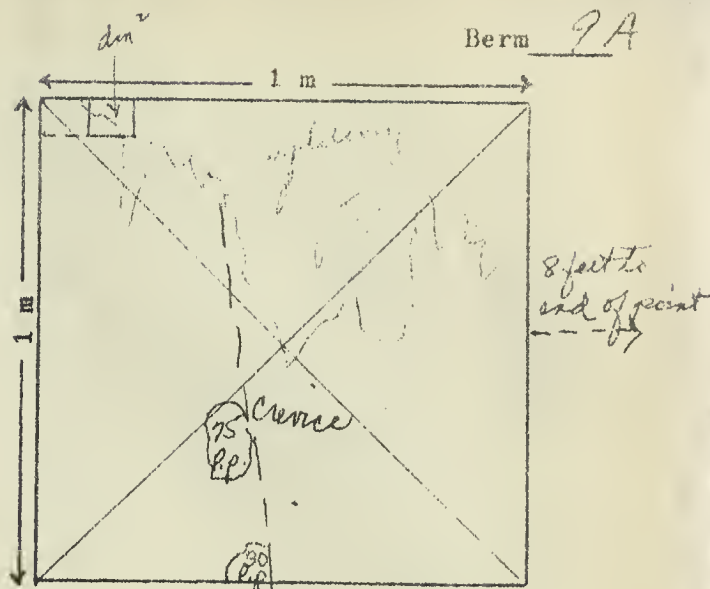
Location:

Area A Section 9 Berm 9 Plot# 85

Other 10 m. from end of Berm 8 to start of Berm 9

Log:

Year	Date	Tide, Time	Other Conditions
1. 1971	4/28	-1.5 8:06 AM	CIL, splashy
2.			
3.			
4.			


Memo count only: S = shells covered with oil; SS = shells with oil, on top of oil
NS = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil=S, no. of shells on top of oil=SS, NS)

CATEGORY	<u>Acmaea digitalis</u> Total (S -SS) NS	<u>Acmaea scabra</u> Total (S -SS) NS	<u>Littorina scutulata</u> Total (S -SS) NS	<u>Balanus glandula</u> Total (S -SS) ONE DM ² NS	Other organisms, Changes in oil residue, algal growth, etc.
1. Live	92 (10S-0)	19	69 (4S-0)	33	2.0 algae
Dead	18 (18S)	1	6 (6S)	87 (5S)	105 P. pidgeoniana
Total-m ²	110 (28S-0)	20	75 (10S-0)	120 (8S)	20% oil, 10% algae, 10% not in oil, 10% not in oil, 10% not in oil
\bar{x} size and range	16 mm. mm.	13 mm. mm.	4 mm. mm.	1 mm. mm.	26 mm. stalk height
2. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{x} size and range	mm.	mm.	mm.	mm.	

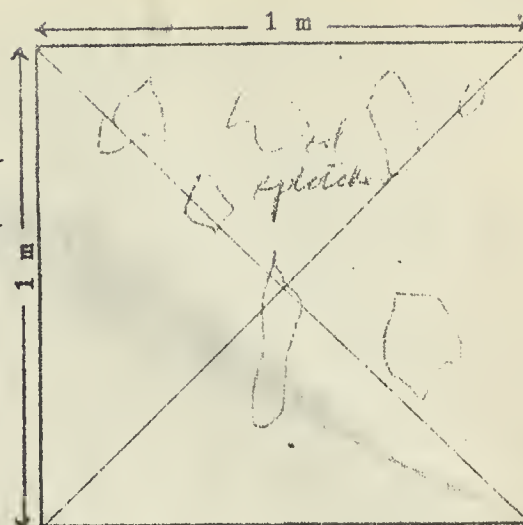
Location:

Area A Section Berm 10 Plot 96

Other: In core, last m² plot in Berm in A

log: BARREN m², high up inside core

	Year	Date	Tide, Time	Other Conditions
1.	1971	4/28	-1.5 B.Obam	OIL SPLASHES
2.				
3.				
4.				


Memo count only: S = shells covered with oil; ~~SS~~ = shells with oil, on top of oil
N_S = shells with no oil, on top of oil

Place in parentheses (no. of shells covered w oil-S, no. of shells on top of oil-SS, NS)

CATEGORY	<u>Acmaea digitalis</u> Total (S -SS) N _S	<u>Acmaea scabra</u> Total (S -SS) N _S	<u>Littorina scutulata</u> Total (S -SS) N _S	<u>Balanus glandula</u> Total (S ₂ -SS) ONE DM ² N _S	Other organisms, Changes in oil residue, algal growth, etc. <u>BARREN, no algae</u> <u>Littorina plus 4</u>
1. Live	3 (0-0)		21 (0-0)		
Dead	0		0		
Total-m ²	3		21		
\bar{X} size and range	13mm mm.	mm.	mm.	mm.	
2. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
3. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	
4. Live					
Dead					
Total-m ²					
\bar{X} size and range	mm.	mm.	mm.	mm.	

1-8
AB 8+9 9

p3

Area A Section ^{high tide} berm Channel

Other shell m² counts for all

except Balanus + Chthamalus
which should be counted ^{TOGETHER} by 10 cm²

Reference (random) in each m^2

Investigator

use this for summary
of term worksheets.

~~total~~ 100
~~h oil)~~

[illegible][illegible]

100 dm²

Balanus

+ *Chthamalus*

$\frac{m^2}{1}$ $\frac{dm^2}{1}$ Live Dead

1
2
3
4
5
6
7
8
9
10

$\frac{m^2}{2}$
11
12
13

140
AB-10
p3

Area A Section high tide Channel perm

Other _____

Investigator _____

see separate
beam worksheets

Year 1977/Date _____ Tide/Time _____ Water temp. _____ Other _____

		Organism Count Size=Avg. mm. (S=shells with oil)											
FULL m ² counts for all species <u>Balanus + Chthamalus</u>		<u>A. digitatus</u>			<u>A. scabra</u>			<u>L. scutellata</u>			<u>Chthamalus + B. glandula</u>		
Plot #	Oil? Algae, other species	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	<u>Reticularia phaealis</u>										10 don't sample in each m ² , record or break →		

Year	Date	Tide/Time	Water temp.	Other
-------------	-------------	------------------	--------------------	--------------

[illegible]

100 dm²

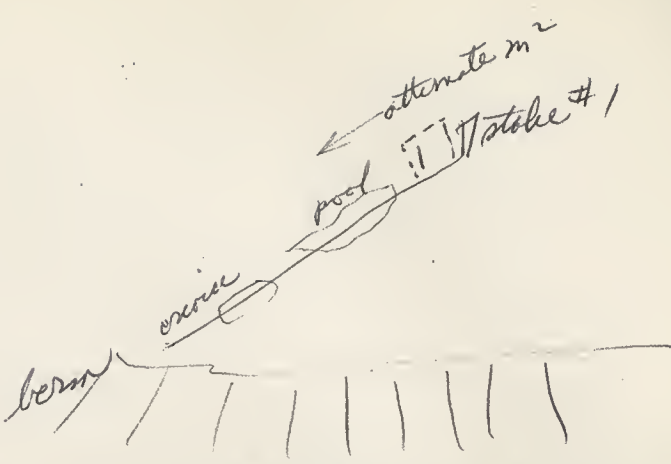
Balanus
x Chthamalus

m² dm² Live Dead

1 - 1
2
3
4
5
6
7
8
9
10

2 - 11
12
13
14
15
16

75

[illegible]

~~check Bal S + 70S~~
~~in #3, #5~~

AS-11
 oil
 + + + +

3/18/71

	Leg	A. de	Bal	Mag	Accm	Zit	hgt	Pelli	Other
+++1	0	0	110S	0	{40LS 4DS	3LS	17LS	61LS, 6DS	
+3	36	57	75S	2	3LS	0	0	0	
+5	26	52	20S	1	0	15LS	0		
+7	8	17	0	0	0	0	0		1 Pay - lay shell
+9	35	2	0	0	0	0	0	0	4 this
									9 Pymms
									7 this
Σ	105	128	205S	3	43LS 4DS 42S	50LS	17LS	61LS, 6DS	10 Pay 117 this

4/12/71

	Leg	A. de	Bal	Mag	Accm	Zit	hgt	Pelli	Other
+++1	0	0	107S	0	41LS	37LS	16LS	61LS 59DS	
+3	31	54	72S	1	0	0	0	0	
+5	26	53	17S	0		17LS			
+7	14	13	0	0		0			1 this
+9	41	2	0	0	0	0	0	0	5 this
									6 Pay
Σ	112	122	201LS	1	41LS	54LS	16LS	61LS 59DS	6 Pay 6 this

DO 4/23/71 FIRST

~~4/23/71~~ 5/11/71

	Leg	A. de	Bal	Mag	Accm	Zit	hgt	Pelli	Other
+++1	0	0	113S	0	29LS	38S	13S	61LS 49DS	
+3	32	53	83S	1	1S	0	0	0	1 this
+5	23	54	16S	0	0	10S			1 accn
+7	18	11	0	0	0	0			2 this
+9	43	2	0	0	0	0	0	0	2 accn, 3 Pay
									5 this
									5 Pay
Σ	116	120	212S	1	30S 30	48S	13LS	61LS 49DS	8 this 3 accn, 8 Pay

DO 5/27/71 NEXT

~~4/14~~ 4/23/71

Y?

leg A de Bal drop dem list myr Polli Other

++++1	0	0	113S	0	32S	35S	13S	49S 49S	
+3	25	49	8S	1	0	0	0	0	
+5	23	24	56	17S	0	12S			1 This
+7	18	19	10	0		0			1 This
+9	48	45	2	0	0	0	6	0	1 Acorn 1 Pay
Σ	116	116	129	172S	1	32S	47S	13S	5 This 8 Pay

DO 5/11/71 NEXT
5/27/71

leg A de Bal drop dem list myr Polli Other

++++1	0	0	117S	0	29S	35S	13S	52S 52S	
+3	35	55	8S	1	1S		0	0	1 This
+5	21	57	16S	0		9S			2 Acorn
+7	20	13	0						1 This
+9	45	2	0	0			0	6	3 Acorn 1 Pay
Σ	121	121	214S	1	30S 30S	44S	13S	52S 52S	6 This 6 Pay

6/7/71

leg A de Bal drop dem list myr Polli Other

++++1	0	0	118S	0	29S	36S	13S	54S 54S	
+3	37	54	8S	1	1S		0	6	1 This
+5	24	49	16S	0		9S			2 Acorn
+7	21	12	0	0					1 This
+9	46	2	0	0			6	0	3 Acorn 2 Pay
Σ	128	117	216S	1	30S 30S	45S	13S	52S 52S	7 This 1 Pay

3/22/71

A

Teg. ele Bal Prop Acen Lict Mgt Polli Other

+ + + / none? none? 0 none? 0 0 none? none?

+ 3

0

0

0

+ 5

²⁴
~~40~~

4

174

2 Amphipods

+ 7

0

0

229

+ 9

244

3DS

62

450

1 Hemigrapsus
 7 of 4/12 tigrinus eel
 longling masses of
 80 cirriformia

Σ

²⁸⁴
 7D(39)

66

853

TRANSECT WORKSHEET - G. Chan
January, 1971

AS-11

pt

Study Site DUXBURY REEF

Area A Section _____ Channel _____

Transect AS-11 Type alternate m²(5)

Other plate #1

Reference _____

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 7/22 Tide/Time _____ Water temp. _____ Other _____

Plot #	Oil?	Algae, other	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
				Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	++		<u>Lept</u>			none						
3	+					none						
5	+		96 in sp 78 other 174L	4						2		
7	+		91 in sp 138 other 229L									
9	+		1 Hemigrapsus 148 sp 302 450L Tigriopus cal	24 in sp 38 other						24	35	

Year 1971 Date 7/22 Tide/Time _____ Water temp. _____ Other _____

Plot #	Oil?	Algae, other	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
				Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	++		<u>Lept scutellata</u>									
3	+		no organisms									
5	+		2 algae	174			4		15	2	4	
7	+		no algae	229			0			0		
9	+		1 Hemigrapsus 148 X of 6 ml Tigriopus californicus wriggling masses of S. curvirostris	450L			4			24	35	

DATA SUMMARY for Study Site DUXBURY REEF Transect AS-12 Oil? ☒ n= 3m² p. 1

L= live
D= dead; += scars
S= oil on shells
T= on top of oil
N= no oil on shells

			Organisms						
Year	Date		<i>Aranea</i> pp.	<i>Myopidia</i> micosa	<i>Pegulus</i> fimbria	<i>Littorina</i> sp.	<i>Galathea</i> fimbria		
			per m ²	per m ²	per	per	per	per	per
1962	5/30	\bar{X}/unit	6.0	15					
-0.9		2m ² Σ	12	3					
4:38 PM		size							
		change							
1971	7/22	\bar{X}/unit	2.6/dm ²	0	1.5/dm ²	2.4/dm ²	18.3L 16.0D 625 9.75	1 hogchop	
++++		32dm ² Σ	31+2D		18+4D	29	220L 192D (145) (1165)	3 hgt	
		in 3m ² size			0.3/dm ²			16 mths	
		change							
1971	8/10 + 8/12	\bar{X}/unit	1.9/dm ²	0	1.3/dm ²	0.52/dm ²	1.5/0.85 / 11.2D 49L 358D	1 hare	
		32dm ² Σ	60		42	17	(265) (2255)	2 hgt	
		in 3m ² size					4D on Rafpis	9A ele	
		change							
		\bar{X}/unit							
		size							
		change							
		\bar{X}/unit							
		size							
		change							
		\bar{X}/unit							
		size							
		change							
		\bar{X}/unit							
		size							
		change							
		\bar{X}/unit							
		size							
		change							

ALL dm² samples

AS-12

oil

2m²

12 dm² in #1

10 dm² in #2 & #3

7/22/71

Acmea leg. List Bal A.

#1	+ 11	3	1L OD	8	60L 9D	(longitudinal)
	+ 12	2	5	7	4L OD	
	++ 13	1	0	3	3L 2D	
	+ 14	2 + locu	1	4	23L 39D (105)	
#2	++ 21	4	4	6	4L 47D (165)	
	N 22	1	0	0	4L OD	2 myt
	++ 23	2	0	0	11L 12DS	
	++ 24	7	1	4	0 11DS	
#3	++ 31	1	0	0	14LS OD	1 knth
	+ 32	3	3	0	91L 50P	
	+ 33	1	3	1	0L 36DS	
	+ 34	4 + 15	0	0	6L 31DS	1 myt
	Σ	31 + 25	18	4D	220L 192D (145) (116S)	
	X/dm ²	2.6	1.5	0.3D	2.4	18.3L 16.8D (1.2S) (9.7S)

ALL den² samples

8/10 - 8/12/71

#1	den ²	Acw	leg	Lat	Bal	A. de	Other
	+ 1	0	2	0	8L 13DS	0	
	+ 2	1	0	1	1L 73D(38S)		
	+ 3	2	1	0	0 10D(38S)		
	++ 4	1	2	0	0 0		
	N 5	0	3		0 4D		
	+ 6	1	1		1S 9DS	0	
	N 7	0	3		0 0	1	
	+ 8	0	1		0 0	1	
	+ 9	2	2		0 0	0	
	0 10	5	0		0 4S in package!	1	
	0 11	0	3		0 1S	4	
	0 12	2	4	0	0 6D	1	
#2	++ 21	3	0	0	6L 42D(34S)	0	
	+ 22	2	2	no	0 0		
	++ 23	2	0	cont?	3LS 12D(7S)		
	+ 24	1	2		0 0		
	+ 25	0	3		0 0		
	+ 26	1	1		0 0		
	N 27	3	0		0 2DS		
	++ 28	5	1		0 22DS		
	N 29	5	0		0 0		
	++ 30	6	0	0	10LS 4DS	0	
	+ 31	4	1	1	1L 0	0	
	+++ 32	2	0	0	17L(2S) 43DS	0	
	+ 33	2	0	0	0 47D(36S)	0	
	+ 34	2	2	2	0 39D(5S)	0	
	+ 35	2	3	3	1L 18D(2S)	0	
	+ 36	0	1	1	0 1D	0	
	N 37	5	4	4	1L 8D	1	
	N 38	0	0	0	0 0	0	
lots of	N 39	0	5	5	0 0	0	
many	N 40	1	0	0	0 0	0	

{ 1 thin
2 mag
1 A

AS-12

7th ed #1 p2

Left
right

nn. *Worm* Germ

pod
pod
stake
#2

Investigator _____

Year Date Tide/Time Water temp. Other

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

DATA SUMMARY for Study Site DOX BURY REEF Transect AS-13 Oil? no n = 2m² p. 1

L= live
D= dead; += scars
S= oil on shells
T= on top of oil
N= no oil on shells

		Organisms					
Year	Date		per m ²	per m ²	per m ²	per	per
<u>1971</u>	<u>7/23</u>	\bar{X}/unit	<u>12.0/m² ~ 1.5D</u>	<u>10L, 12D</u>	<u>1 Panceros</u>	<u>4 Mysis SHELLS</u>	<u>1 Mysidella SHELL</u>
		Σ	<u>24L, 3 shells</u>		<u>1 Pectinoproducta</u>		
		size			<u>1 Rais</u>		
		change			<u>2 tubicolans</u>		
					<u>1 Lili pectinata</u>		
					<u>2 Philodidae</u>		
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					

7/23/71

Asman
egg

Bal

Other

DIED

N 1

24L, 30 shells

10L, 12D

1 Lint Pent

4 myt shells

1 Pagnrus

^{Myrdia}
1 Chiton shell

N 2

0

0

1 Thais

2 tubeworms

1 Pugettia prolata

2 Paladidea penita

A hand-drawn map on a piece of paper. A solid line represents a creek, labeled "creek" and "bedrock" with an arrow pointing to it. To the right of the creek, there are two dashed lines forming a triangular shape. The top vertex is labeled "1" and the bottom vertex is labeled "2". To the right of this dashed shape, the text "Stake #3" is written.

[illegible]

AT-14 ^x
p²

see map

Investigator _____

[illegible][illegible]

			Organism Count Size= Avg. mm. (S=shells with oil)																	
Plot #	Species=		Live			Dead			Live			Dead			Live			Dead		
	Oil?	Algae, other	Count	Size	Avg. mm.	Count	Size	Avg. mm.	Count	Size	Avg. mm.	Count	Size	Avg. mm.	Count	Size	Avg. mm.			

TRANSECT WORKSHEET - G. Chan
January, 1971

AT-14

p1

Study Site DUXBURY REEF

Area A Section Channel

Transect Type

Other AZ4, M² EVERY 50 METERS

AZ2, M² EVERY 25 METERS

Reference

Investigator CARL ZEICLER

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date JULY 20 Tide/Time -1.1/4:42 AM Water temp. Other

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
		<u>S. purpuratus</u>									
AZ4-1	NO	90%	0A	0D							
2	NO	95%	8L	0D							
3	NO	95%	0L	0D							
TOTAL PLOTS = 3		280 ÷ 3	8L	0D							
		$\bar{x} = 93\%$	$\bar{x} = 2.7L$	0D							

Year 1971 Date JULY 21 Tide/Time -1.2/5:24 AM Water temp. 15°C Other

Plot #	Oil?	Species=	Organism Count			Size= Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
		<u>BORING CLAMS</u>									
AZ2-1	+	90%	17L	6D							
2	NO	85%	12L	5D							
3	NO	60%	3L	5D							
4	NO	75%	25L	12D							
5	+	55%	2L	0D							
TOTAL PLOTS = 5		365 ÷ 5	59L	28D							
		$\bar{x} = 73\%$	$\bar{x} = 11.8L$	5.6D							

THE SIZE OF THE BORING CLAMS REMAINED SHROUDED BY THE PROTECTIVE SHALE.

OBSERVATIONS: THE DETAILED OBSERVATIONS ARE CONTAINED IN THE ATTACHED TRANSECT WORK SHEETS, A SUMMARY OF WHICH FOLLOWS

AREA A

● 1. SEA URCHIN TRANSECT AZ₄, 3 PLOTS:

- a. Strongylocentrotus purpuratus LIVE $\bar{X} = 2.7/m^2$
DEAD $\bar{X} = 0/m^2$
- b. ALGAE _____ $\bar{X} = 93\%/m^2$
- c. OIL _____ = NONE OBSERVABLE

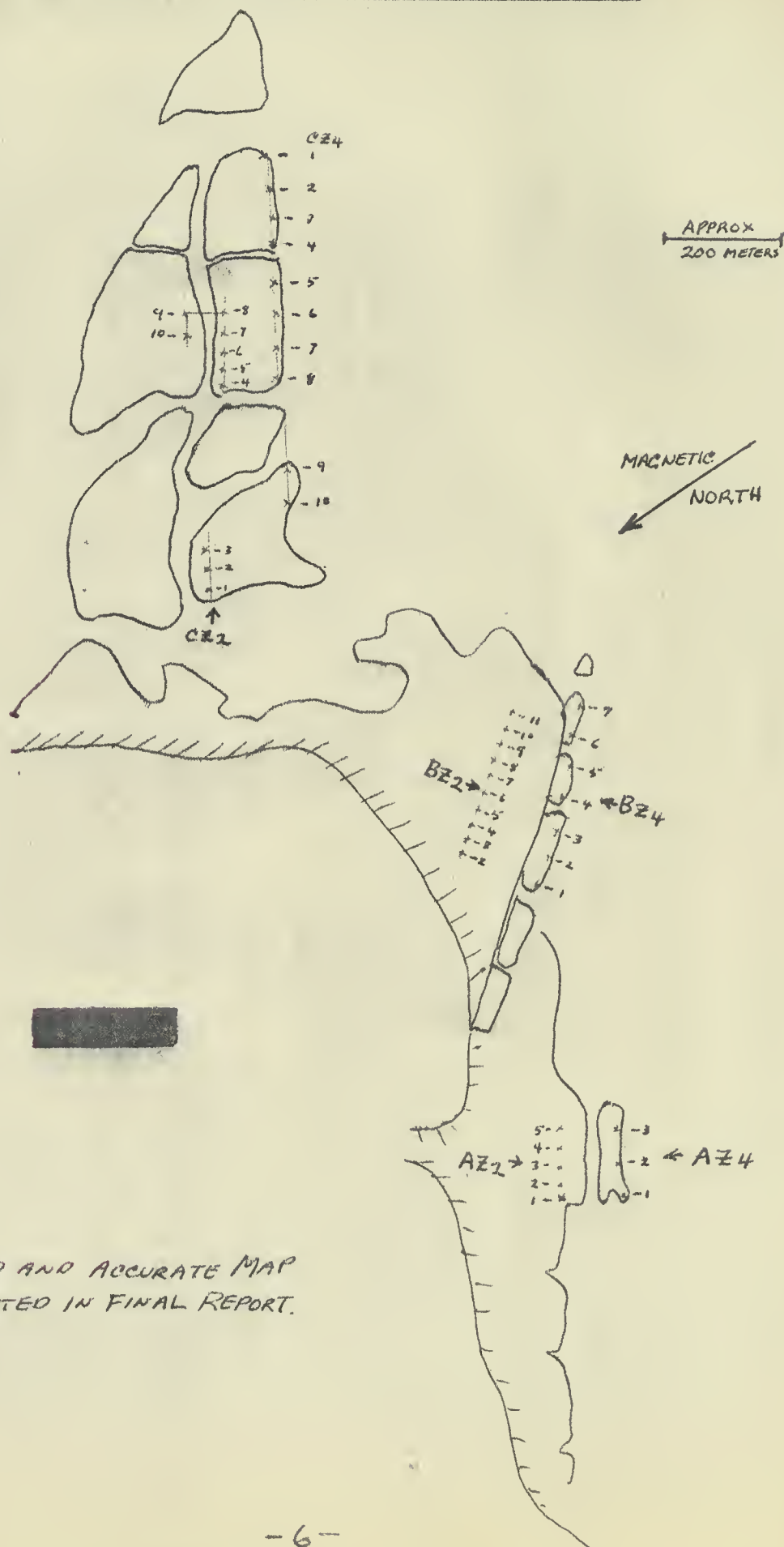
● 2. BORING CLAM TRANSECT AZ₂, 5 PLOTS:

- LIVE CLAMS $\bar{X} = 11.8/m^2$
DEAD CLAMS $\bar{X} = 5.6/m^2$
ALGAE $\bar{X} = 73\%/m^2$
OIL = PLOTS #1 AND #5, LESS THAN 25%
= PLOTS #2, 3 AND 4, NO OIL

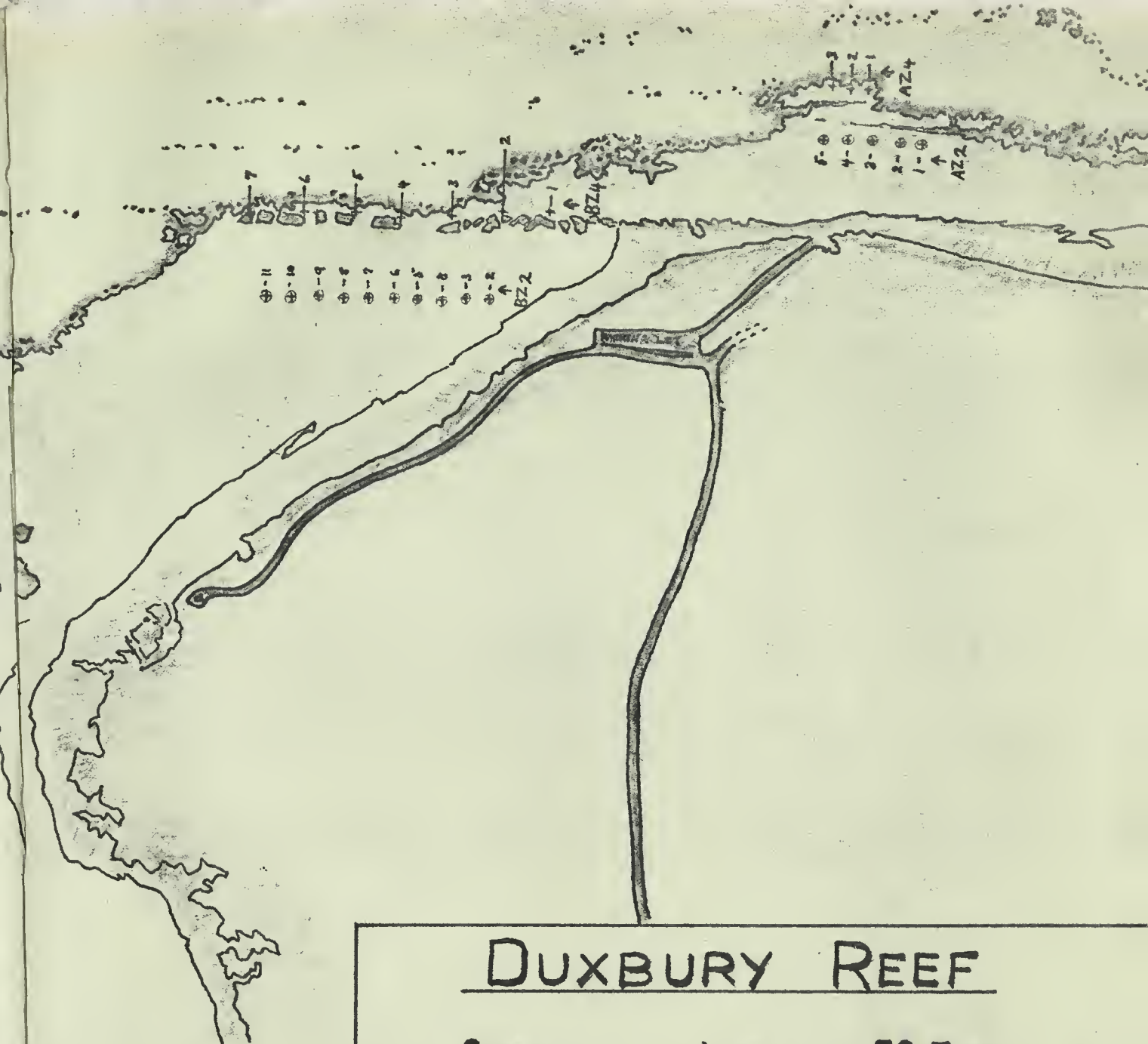
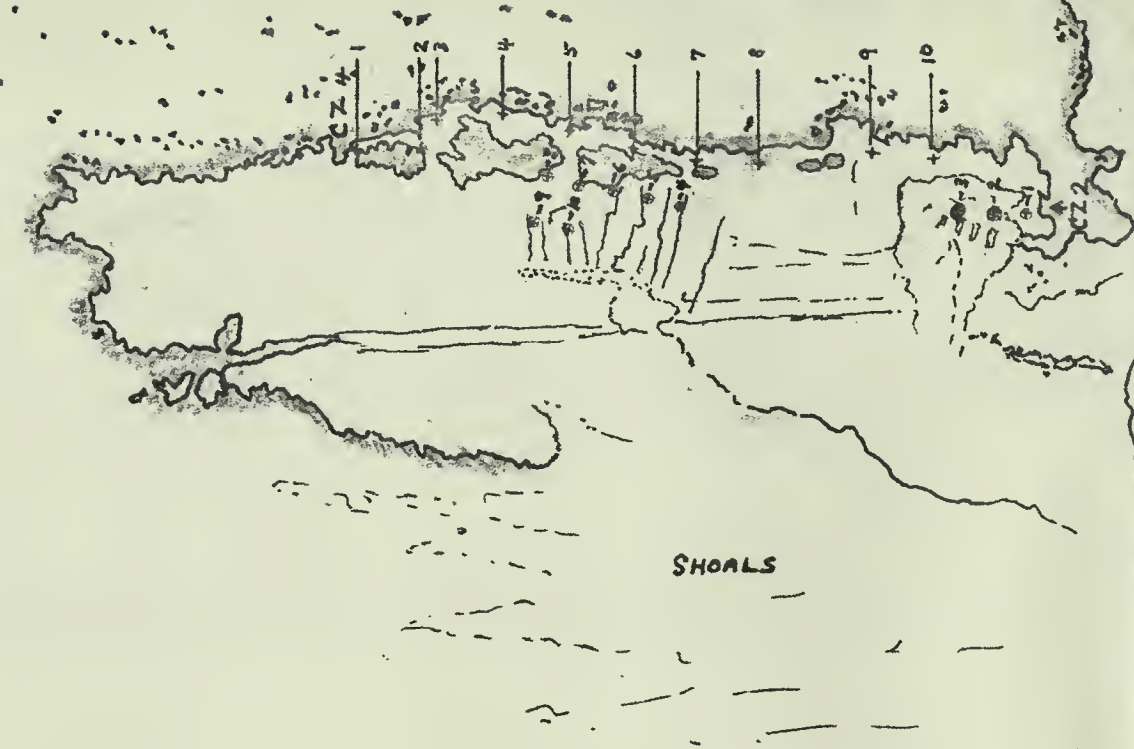
- MEAN OF PERCENTAGE OF ALGAE FOR THE 8 PLOTS ON AREA A: $\bar{X} = 81\%/m^2$

APPROXIMATE LOCATIONS OF PLOTS ON DUXBURY REEF *

Ziegler
AT-14
BT-12
CT-15



* A MORE DETAILED AND ACCURATE MAP
WILL BE PRESENTED IN FINAL REPORT.



DUXBURY REEF

SCALE: 1 cm = 58.3 m

LEGEND

- | | |
|-------------|------------|
| ● — PLATEAU | ● — OCEAN |
| ● — BLUFF | ● — RIDGES |
| ● — REEF | + |
- TRANSECT PLOTS
+ = URCHINS ⊕ = BORING CLAMS



Abalone -
Subtidal - Agate Beach Transect.
Marked by yellow rope

Area A
Reef

Agate Beach Drift Wood Hole

DATA SUMMARY for Study Site DUXBURYTransect AX-6A Oil? AT-6n= 9m² p. 1

L= live

D= dead; += scars

S= oil on shells

T= on top of oil

N= no oil on shells

		Organisms	<i>Argula fenestrata</i>	<i>Anthopleura sanguinea</i>	<i>Molgula muscosa</i>	<i>Acrothia spirata</i>		
Year	Date		per m ²	per m ²	per m ²	per m ²	per	per
1969	5/17	\bar{X}/unit	63.9	6.9	0.2			
		Σ	575	62	2			
		size	7/9	4/9	1/9			
		change						
1969	5/30	\bar{X}/unit	76.6	8.0	0.1	0.1		
		Σ	689	72	1	1		
		size	9/9	5/9	1/9	1/9		
		change						
1969	4/27	\bar{X}/unit	66.6	6.9				
		Σ	599	62				
		size	9/9	4/9				
		change						
		\bar{X}/unit						
		size						
		change						
		\bar{X}/unit						
		size						
		change						
		\bar{X}/unit						
		size						
		change						
		\bar{X}/unit						
		size						
		change						
		\bar{X}/unit						
		size						
		change						

$A - 6 + 7z$

FACING SHORE

Other *Between lines 6 & 7*

Zoanaps; Outline 7

where stream begins to fan out
perpendicular from pipeline
on shore

Chen & P.H.G. notes

glass
water
sand
pool

0 pipe

	8	7
1		6
	9	
2	3	4
	5	

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	5/17	7:00 AM	tia tac toe square meters #1 over pool #3 over stream- like pool	#1 #2 #3 ? #4 #5 #6 #7 #8 #9 Total \bar{x}/m^2	60 kg 70 kg 27 kg, 1 sea anemone 92 kg, 1 sea anemone, 1 chiton 43 kg, 2 sea anemones 54 kg 52 kg 56 kg 42 kg 90 kg 586 kg, 4 sea anemones, 1 chiton 65.1 kg, 0.4 sea anemones, 0.1 chiton

DX-6A

A-72

TRANSECT WORKSHEET - G. Chan

Location - Site Title DUXBURY

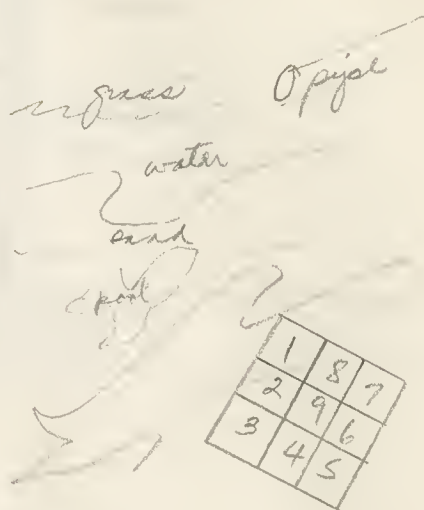
FACING SHORE

Area A Section Transect 6Other Line 7 Zone map

Reference

Chan's Ph.D notes

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	5/17	8:00 AM	tie the toe square meter plots #1 over water #2 water + large rocks #5 stream #7 slight water	#1 #2 #3 #4 #5 #6 #7 #8 #9 Total 639 x/m ²	67 kg 65 kg, 1 sea anemone 46 kg 64 kg, 5 sea anemones, 2 chitons 72 kg, 23 " " 62 kg, 33 " " 80 kg 55 kg 62 kg 575 kg, 62 sea anemones, 2 chi 63.9 kg 6.9 0.2
1969	5/30	5:45 AM	#1 over water #2 water + large rocks	#1 #2 #3 #4 #5 #6 #7 #8 #9 Total 763 x/m ²	125 kg, - , 1 sea anemone 110 kg, 2 AX 20 kg 67 kg 52 kg 8 AX 80 kg 37 AX 96 kg 17 AX 1 mops 106 kg 8 AX 33 kg 689 kg 72 AX 1 mops, 1 sea anemone 76.6 kg 8.0 0.1 0.1



A-72

[illegible]

A-IX left
at right
RANDOM

Area A Section _____ Transect _____

ocean

Other Line 1, left of x (or 1st island
left of x) search line
and right of x (mays)

Chan's Ph.D notes
1st island to left of X

[illegible]

TRANSECT WORKSHEET - G. Chan

X
A-1, 2nd X
left

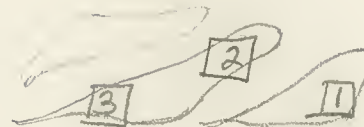
Location - Site Title DUXBURY

Area A Section _____ Transect _____

Other Line 1, 2nd island

left of X (map)

seen



Reference

Chen's Ph. Notes

2nd island left of X

island Y

seaweed pool

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	5/17	7:00 AM	2nd island left of X random square meter plots	#1	st. edge 7 sea urchins
				#2	pool on island 53 sea urchins
				#3	left tip of island 1 sea urchin
					61 or 20.3/m ²

Am

RANDOM

Other

#1' - vertical line to

#2 - far left end⁰

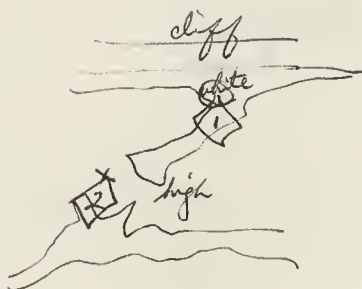
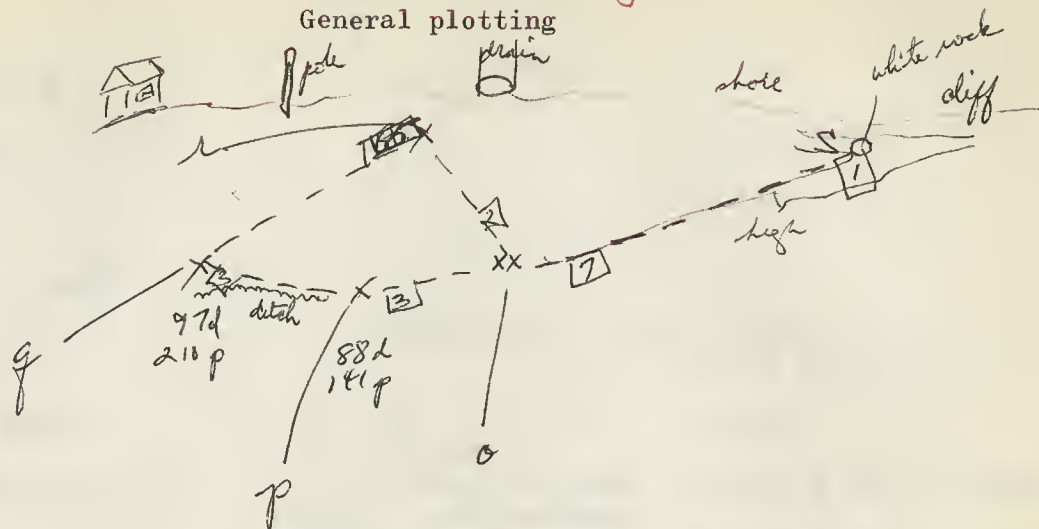
1 1

Char's Ph. D. notes

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	5/17	7:00 AM	square meter plots	#1 #2	1 sea anemone, 1-6" sea stars 3 sea anemones, 1 sea star 4 sea anemones 2 sea stars

BASE COUNT 1- page 2
May 30, Friday
5:45 A.M.

RANDOM PLOTS, every 10 m or so



S (1)

33 teg, 6 sea anem

(2)

61 teg

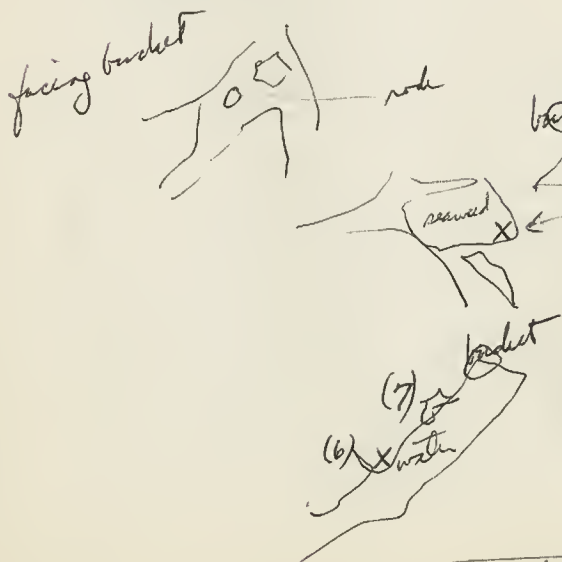
(3) on black patch 5 adult, 28 juvenile teg
near water,
about 5 ft to
rt of stream

(4) in large pool, 23 teg, 18 sea anem
on corner of
big rock (no nail)

(5) gigartina 17 teg, many periwinkles
and fucus

(6) covered w 2 teg
gigartina, some
fucus

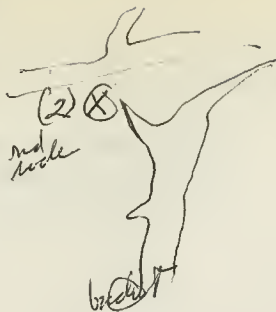
(7) more barren, 56 teg
one small island
rock



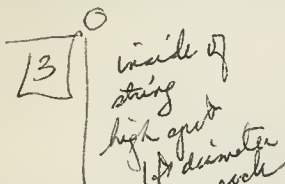
place yellow bucket = 165 m, 88 yds from drain

BASE COUNT 1- page 3
May 30, Friday
5:45 A.M.

10m from ^{area} (plot 2)



- (1) *red rock* 82 teg
- (2) 62 teg, 1 chi
- (3) 50 teg



Along low shallow ditch,

yellow bucket= 88 yds drain
141 from 1st pole to left

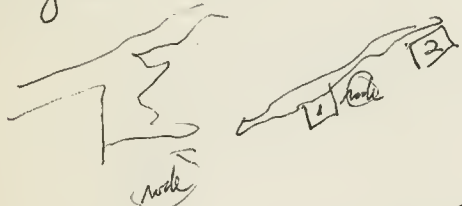
lined up toward house on hill

facing ocean

p (1)

70 teg

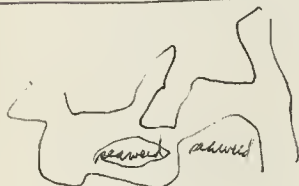
- (2) edge of transect in water 30 teg, 2 chi, 1 anemone
- (3) *mud/giant starfish* ditch bends to 27 teg, 1 chi, 1 anemones left, lay line in usual direction



facing shore 97 yds on drain, 210 yds to post

g

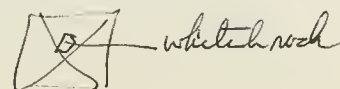
- (1) large holy rock 45 teg, 1 chi to rt of water, just before stream, horizontal to shore
- (2) large rock in stream which angles toward left of shore *transect over water* 90 teg, 10 sea anem
- (3) large rock 60 teg, 1 cancer crab, 1 chi next to flat holy rock twice as large
- 5-arm pool
transect completely in water, large pool
- (4) near barren 1 teg, sparse gigartina, flat area pelvetia



- (5) 43 yds from drain perwinkle, a few pelvetia obsis

r

transect on whitish rock, high mound (standing at drain, 45° rt)



BASE COUNT 1- page 4
 May 30, Friday
 5:45 A.M.

Continuing from plot (5) on whitish rock-

Lined up between whitish rock
 and bucket on double nails of
 area Z square plot area

(1) speckled rock 1 teg

(2) line goes over water, perpend
 to drainpipe 1 acmaea pelta, fucus, gigart.

10 miles from r

192
 173
 243
 140
 33

 781

243
 62
 44
 53
 51

 453

666

 54
 144
 117
 200
 151

33
 28
 78
 48
 375

 262

101
 154
 96
 238

 589

89
 85
 103
 87
 270

 634

3
1
8

over

Other _____

2/1 ✓

Investigator _____

[illegible][illegible]

Year Date Tide/Time Water temp. Other

[illegible]

[illegible]

[illegible]

B7-4

seen

Transect BT-4 Type 16 m²

Other _____

Reference

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year Date Tide/Time Water temp. Other

[illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

BT-6

[illegible]

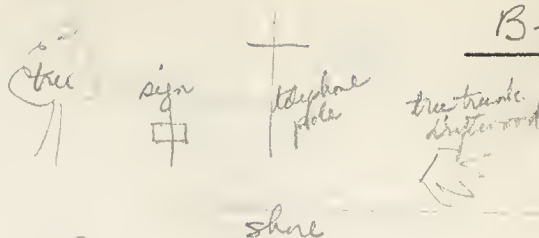
TRANSECT WORKSHEET - G. Chan

B-6

Location - Site Title DUXBURY

Area B Section _____ Transect 6

Other opp sign & telephone pole
on shore, line placed
along eel grass



Reference

Chan's Ph.D. notes

Year	Date	Tide	Other conditions	Plot, Strip	Description
1969	5/17		tree-trunk toe square meter plots Plot #1 eel grass edge	#1	84 kg, 16 sea anem, 1 acanthina
				#2	55 kg, 15 sea anem, 23 acan
				#3	58 kg, - 4 acan
				#4	48 kg, 3 sea anem, 3 acan
				#5	60 kg, 41 sea anem, 7 acan
				#6	52 kg, - 2 acan
				#7	41 kg, -
				#8	79 kg, 4 sea anem
				#9	40 kg, 18 sea anem, 3 acan
			Total X/m ²	676	517 kg 116 # 43 acan
					116
					43
					676

TRANSECT WORKSHEET - G. Chan

Location - Site Title DUXBURY

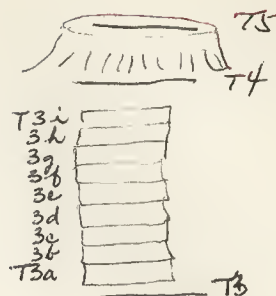
Area B Section _____ Transect Between
B3 and B4

Other Nine transects
(T3a through T3i) of
10 m² each

n = 90 m²

Reference

Biol 20A students



BT-7

COVER
SHEET
ONLY

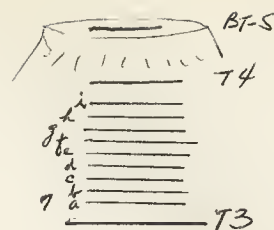
T2

T1

Year	Date	Tide	Other conditions	Plot, Strip	Description			
1970	3/10	0.1 @ 7:24 AM		TRANSECT	<i>Regula fimbriata</i> \bar{x} leg/m ²	<i>Reg.</i> \bar{x} leg yrst	<i>Regalia</i> \bar{x} for <i>Regalia</i> m ²	
				T3a	59.4/m ²	3.5 yrs	1.0, 24.0	
				T3b	39.8	2.7	0.2, 12.0	
				T3c	37.9	4.0	0.2, 5.0	
				T3d	39.8	2.4	0.2, 5.0	
				T3e	37.2	4.5	1.0, 2.5	
				T3f	38.6	3.0	0.9, 2.5	
				T3g	58.0	5.0	2.0, 9.0	
				T3h	28.0	4.9	0.7, 3.0	
				T3i	38.8	3.1	0.2, 4.7	
				$\Sigma \bar{x}_i$	377.5	33.1	6.4	67.7
				mean of the means	41.9	3.7	0.7	7.5

BT-7a
10¹⁰ P¹

Other _____



Investigator _____

Year 1971 Date _____ Tide/Time _____ Water temp. _____ Other _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

BT-76 X
2nd 10 p2

(see BT-7a)

Investigator _____

Year 1971 / Date 10/10/71 Tide/Time 10:00 Water temp. 15.0 Other 1000

Year Date Tide/Time Water temp. Other

[illegible]

BT-7c
3416^{p1}

Investigator _____

Year 1971 Date _____ Tide/Time _____ Water temp. _____ Other _____

Year Date Tide/Time Water temp. Other

[illegible]

BT=7d

4d^{p1}
10

Other _____

Investigator _____

Year 1971 Date _____ Tide/Time _____ Water temp. _____ Other _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

BT-7e
5th P'

[illegible]

BT-78
6th P1

Other \$10^{1/2} each

Investigator _____

Year 1971 Date _____ Tide/Time _____ Water temp. _____ Other _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

BT-7g

p1
7th 10

Investigator

Year 1971 Date	Tide/Time	Water temp.	Other
1971 10 10	10:00	18.5	
1971 10 11	10:00	18.5	
1971 10 12	10:00	18.5	
1971 10 13	10:00	18.5	
1971 10 14	10:00	18.5	
1971 10 15	10:00	18.5	
1971 10 16	10:00	18.5	
1971 10 17	10:00	18.5	
1971 10 18	10:00	18.5	
1971 10 19	10:00	18.5	
1971 10 20	10:00	18.5	
1971 10 21	10:00	18.5	
1971 10 22	10:00	18.5	
1971 10 23	10:00	18.5	
1971 10 24	10:00	18.5	
1971 10 25	10:00	18.5	
1971 10 26	10:00	18.5	
1971 10 27	10:00	18.5	
1971 10 28	10:00	18.5	
1971 10 29	10:00	18.5	
1971 10 30	10:00	18.5	
1971 10 31	10:00	18.5	

[illegible][illegible]

BT-2ch
8_±10 p1

Other 10 m² each

Investigator _____

Year 1971 Date _____ Tide/Time _____ Water temp. _____ Other _____

Year Date Tide/Time Water temp. Other

[illegible]

BT-7i^x
9th 10¹

Investigator _____

Year 1971 Date	Tide/Time	Water temp.	Other
10/10/71	10:00	18.5	
10/11/71	10:00	18.5	
10/12/71	10:00	18.5	
10/13/71	10:00	18.5	
10/14/71	10:00	18.5	
10/15/71	10:00	18.5	
10/16/71	10:00	18.5	
10/17/71	10:00	18.5	
10/18/71	10:00	18.5	
10/19/71	10:00	18.5	
10/20/71	10:00	18.5	
10/21/71	10:00	18.5	
10/22/71	10:00	18.5	
10/23/71	10:00	18.5	
10/24/71	10:00	18.5	
10/25/71	10:00	18.5	
10/26/71	10:00	18.5	
10/27/71	10:00	18.5	
10/28/71	10:00	18.5	
10/29/71	10:00	18.5	
10/30/71	10:00	18.5	
10/31/71	10:00	18.5	

Year Date Tide/Time Water temp. Other

[illegible]

x

BB-8

new berm transect

did not count
for 1971

Transect BR-9

Transect BR-9 is located in area B on the northwestern edge of the ridge. It is made up of 2 large tidepools, one of which had easily distinguishable boundaries, while the second pool, pool #2, did not. Because of this it was necessary to place 2 m² frames over the area, dividing it into decimeters, and thus obtaining our count, in pool #2.

My objective of this transect was to count only, *Herminia smithi*, (a small tectibranch) and the Littorines in the two pools. In the first pool, I obtained the count by counting each individual organism in the pool; while in the second pool this was almost impossible, because of the extensive area over which the pool covered. Because of this the m² frames were used, divided into decimeters (as shown on page 4, and the organisms were counted.

Although various areas around the pools was covered with oil, none appeared to be in the pools. There was no direct evidence that the oil did any damage at all in this particular area.

The *Herminia*s were all found in the first large pool, and only in one area, grazing on the green algae. The Littorines appeared in great numbers in both pools, with ~~2,490~~ ^{2,490} in the 2 m² area and 1,973 in the first large pool.

each pool total count of H. smithi
10 dm²/m² sampling of L. scutellata in each pool

BR 9 5
26

Observations

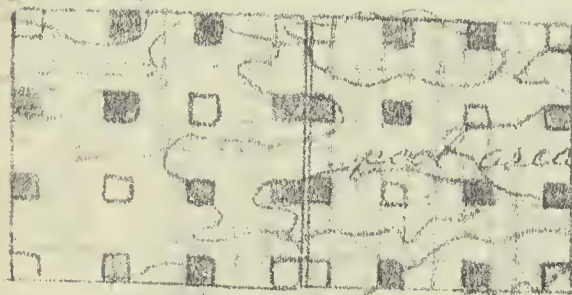
BR-9

Tidepool area

• marker

pool 1

Ridge B



X₁

X₂

■ = decimeters counted

North

East

West

South

The Tidepool area
BR-9 is located on
the north western edge
of Ridge B. (BR-10)

summer,
1971

10 dm² in each m²

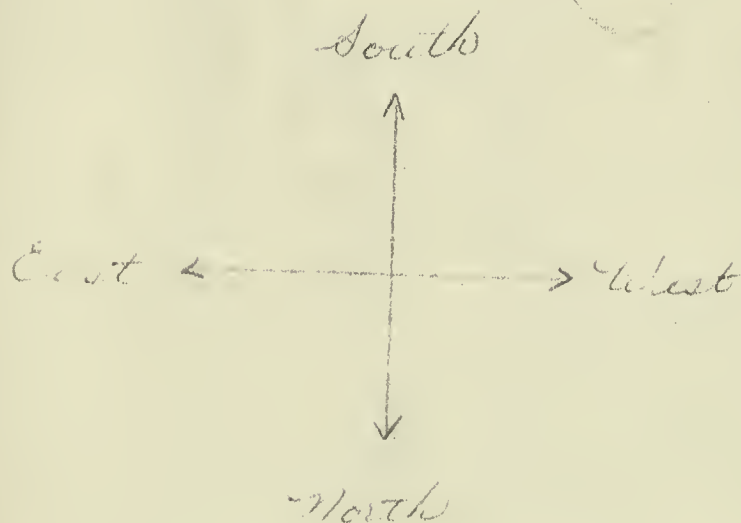
dm² plots #1, 4, 7, 10 in each row

Ridge total count of Lothia gigantea only BR10 2-7

Observations (note presence of other species, but DO NOT count others)

BR = 10

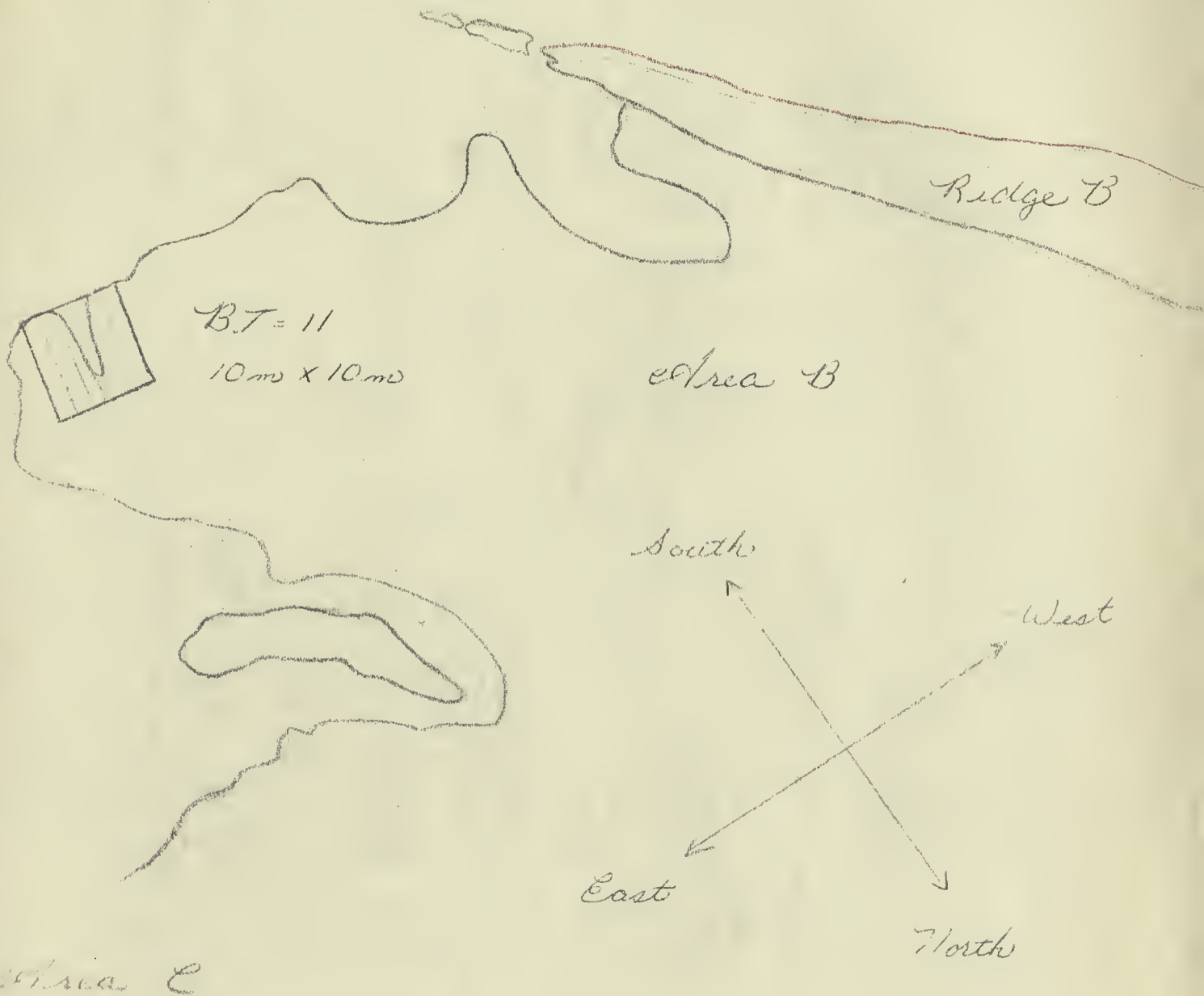
Ridge - ed area B
500m.
along top of
ridge.



BR = 9

Lidpool area

Total count only of *Cryptochiton* BT-11 X7
stellari



Observations. BT-11

p2

SEE MAP

under 1-11 x 12

Transect _____ Type _____

Other Zone 4 m² every 50m m² counts of STR only 2-8

Zone 2, m² every 25 m m² counts of PLA only ~~the map~~ 2-9

live ~~deposited~~ for
organisms

Reference

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year Date Tide/Time Water temp. Other

[illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

TRANSECT WORKSHEET - G. Chan
January, 1971

CT-1

13

Study Site DOXBURY REEF

Area C Section 2 Channel

Transect CT-1 Type 10m²

Other Island north of

Area C north flood channel

(on crest of ridge on island)

Reference Selbourn's map

Investigator _____



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

Year Date Tide/Time Water temp. Other

[illegible]

Study Site DOXBURY REEF

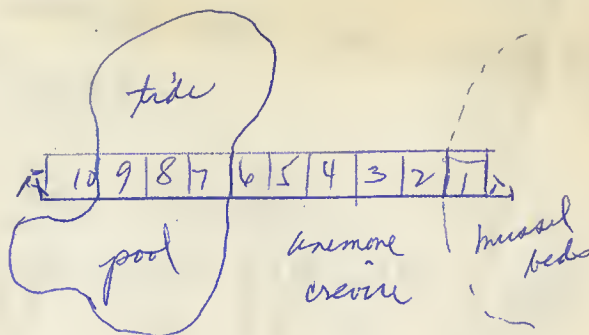
Area C Section Channel

Transect CT-2 Type 10m²

Other full m² counts for each species except for Balanus glandula = 10 den² in each m²

Reference _____

Investigator _____



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 72 Date 4/27 Tide/Time 0504:55 Water temp. 15°C Other Clear

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		Algae, other <i>Mytilus californicus</i> <i>Pollisipes</i> ?	18						1	50	150
2		<i>Cerastium</i>	16			10 Xan			15	1"	80
3		<i>Fucus</i> <i>Ulva</i>	30			10 Xan 6 Ele			8		20
4			1			0					12
5						5 Xan			6		3
6						5 Xan					15
7									3		1
8											0
9			1			2 Xan			28	≤ 5cm	0
10			2			1 Ele			10	31 Small	10

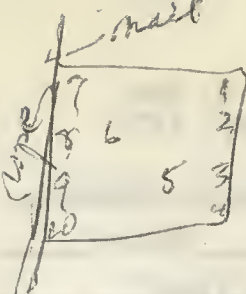
Year 72 Date 6/28 Tide/Time _____ Water temp. _____ Other _____

Plot #	Oil?	Species=	Organism Count			Size= Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1	0	BALANUS 10 den ² /m ² written count in back of paper	6			0			322		82
2			4			10			113		51
3			8			10			3		21
4			10			8			1		1
5		<i>Ulva</i> covering m ² 3,4,5,9,10	12			6					
6						5					
7						5					
8											
9			4			2			6		
10			9			2			4		

6/28/72

Balances over size = 2 mm dia

DM



nl.	1	2	3	4	5	6	7	8	9	10
1	168L 20	28L 10	45L 10	17L 00	45L 10	52L 60	14L 20	4L 20	210L on March 70	170L 80
2	14L	96L 20	120L 30	130L 10	16L 20	48L 20	120L 100	3L	14L	80L 10
3	10L	90L 10	32L 20	115L 80	6L	26L 10	215L 30	48L 20	28L	6L
4	200L 80	ulva →								
5	ulva →									
6	water									
7	water									
8	water									
9	ulva + water →									
10	ulva →									

425

100m
42L
80

TRANSECT WORKSHEET - G. Chan
January, 1971

Study Site Transect #3

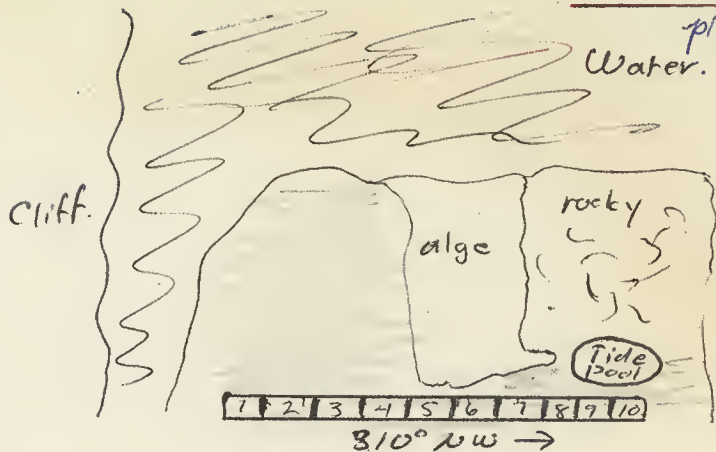
Area Section Channel

Transect Type

Other This transect is on the seaward side of the reef bearing 310° NW

Reference Points towards two telephone poles

Investigator Steve Harris



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 4/29 Tide/Time -9 9:54 Water temp. 10°C Other Overcast, Cold foggy

		Organism Count Size=Avg. mm. (S=shells with oil)											
Species=		Mytilus Calif.			Pollycipes Poly			Anemone Anthopleura			Snail Chitons		
Plot #	Oil? Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		700	0	9.5/35	307	0							
2	Yes	800	0	9/3	152	0		7	0				
3	Yes	500	0	6/2	203	0							
4		600	0	8/2	336	0					4	Small	
5		500	0	5.5/1.5	230	0		10			1	chiton.	
6		1200	0	4.5/1.5	345	0							
7		1500	0	5/2	220	0							
8		1500	0	4.5/2	180	0		4	0				
9	Heavy	1600	0	5.5/2	255	0							
10		400	0	8/2.5	73	0		10	0				
		All Healthy			All Healthy								

Year 1971 Date 5/4 Tide/Time -8 7:06 Water temp. 10°C Other Overcast, Cold foggy

		Organism Count Size=Avg. mm. (S=shells with oil)											
Species=		Mytilus Calif.			Pollycipes Poly			Anemone Anthopleura			Snail Chitons		
Plot #	Oil? Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		800	0	7/3	100								
2	Yes	900	0	9/3	100								
3	Yes	500	0	7/3	100			10			1	Chiton.	
4		200	0	6.5/1.5	300			6					
5		1000	0	7/2.5	200			1					
6		1200	0	4.5/1.5	250								
7		1500	1	5/2	200								
8		1600	1	5.5/2	150			4					
9	Yes	1500	0	5.2/2	200								
10		400	0	8/2.5	3								

TRANSECT WORKSHEET - G. Chan
January, 1971

Map the oil in each m²
note crabs.

3-3
CT-4
p3

Study Site DUXBURY REEF
Area C Section 3 Channel _____
Transect CT-4 Type 10 separate m²
Other see diagram
10 dm² random sample counts in
each m² for MYTILUS; full m² counts
Reference for POLICIPES & crabs
Investigator _____

see map

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

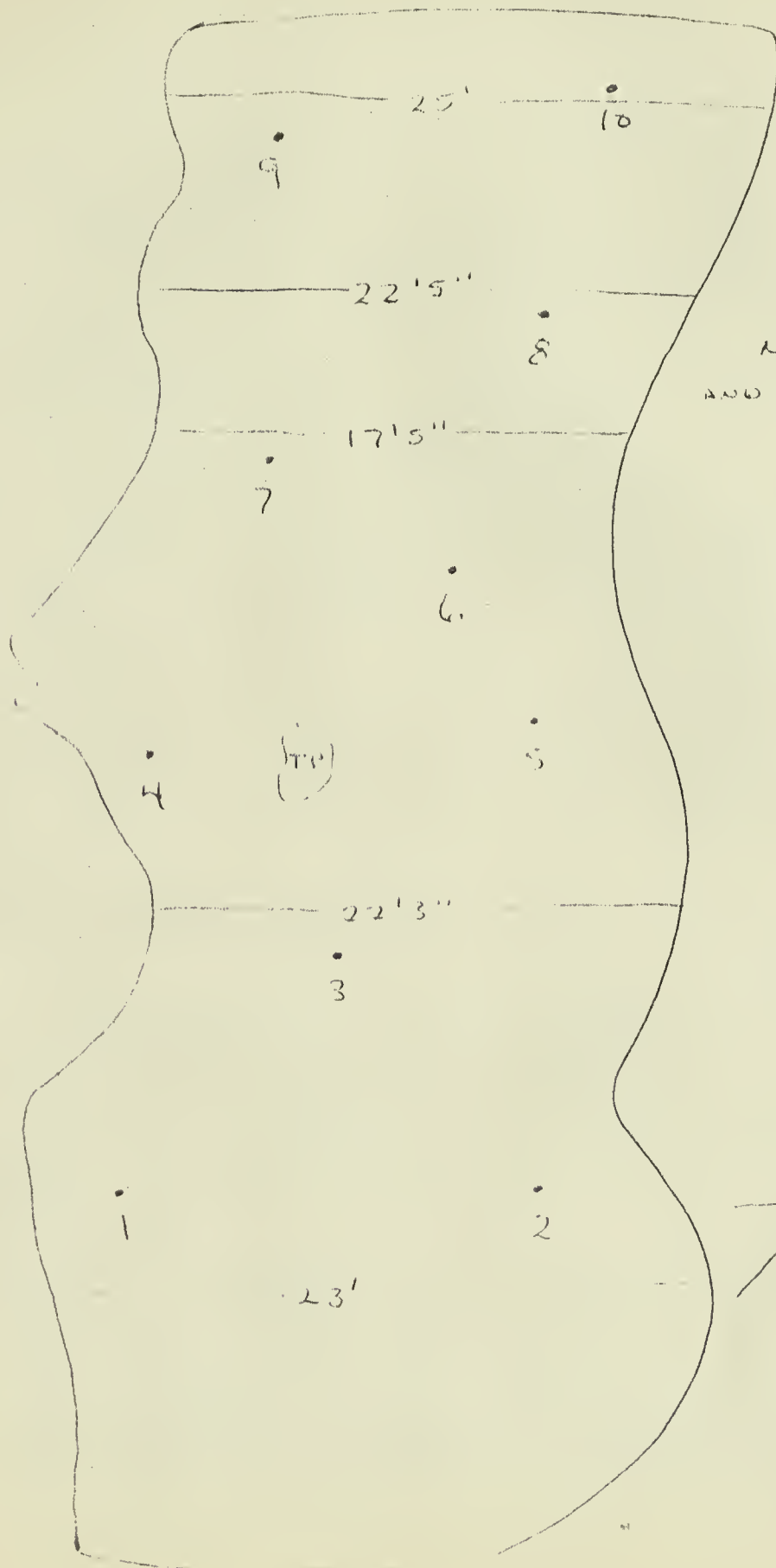
		Organism Count			Size-Avg. mm.			(S=shells with oil)						
Plot #	Oil?	Species=	Mytilus			Pollycipes			Crabs			LIST (no count) presence of other species		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
			total 100 m² record 10 dm ² counts of back of page			m ²	m ²							

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

		Organism Count Size= Avg. mm. (S=shells with oil)												
Plot #	Species=													
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size

STAKES
TP - TIDE POOL

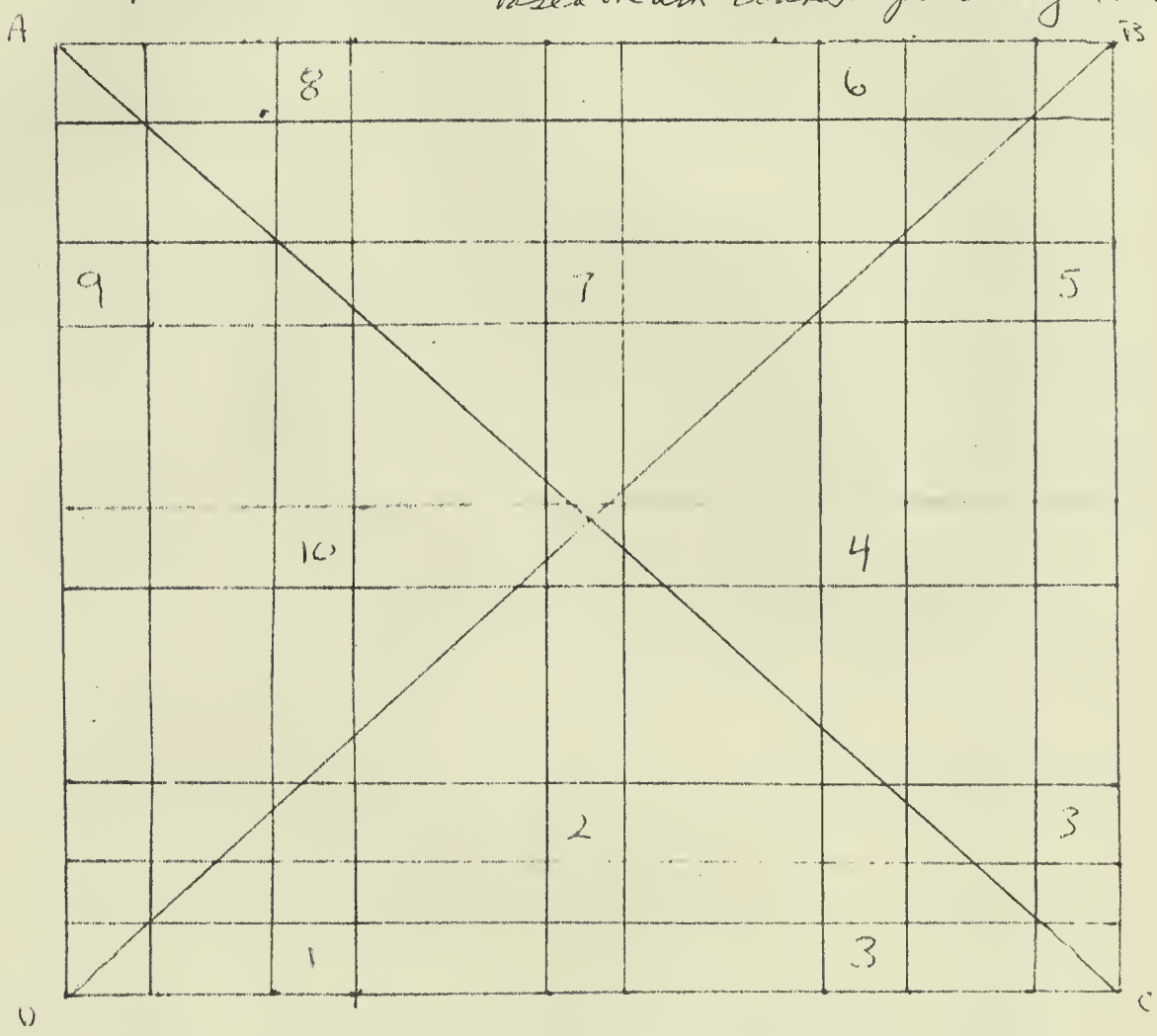
GRABBY LITZARVOC
AND WERNALLS REEF



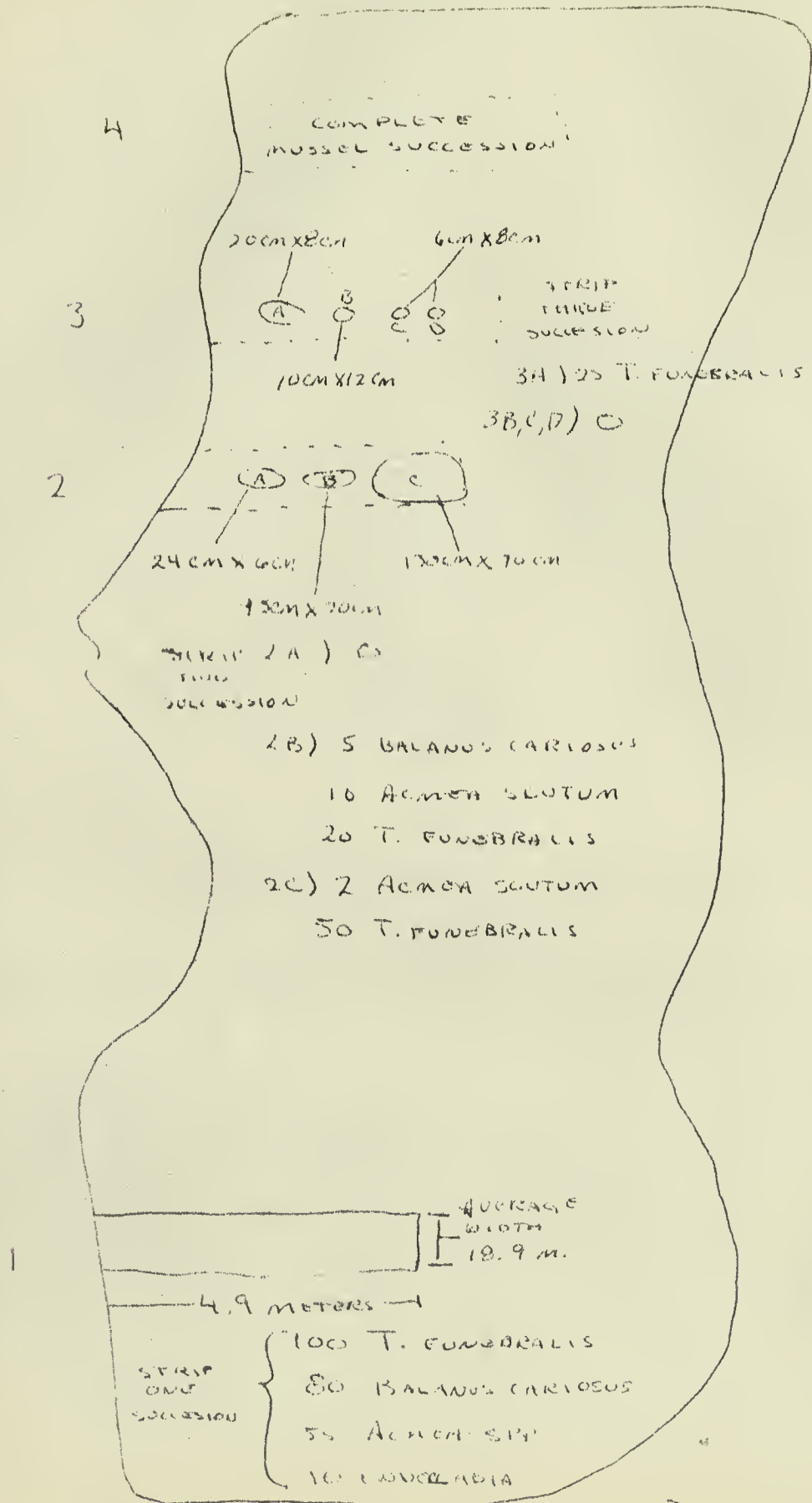
Take dm^2 samples for *Mytilus*, *Balanus*,
Tegula & *Thais* *Lamna* spp & *Pollicipes* - give m^2 count

Take dm^2 samples for *Littorina* if very dense population

Keep all dm^2 counts on record. DO NOT MAKE m^2 estimate
based on dm^2 counts - give average dm^2



date?



[illegible]

TRANSECT WORKSHEET - G. Chan
January, 1971

CT - 5

3-4
p2

Study Site Puxbury Reef

Area C Section L Channel

Transect CT 5 Type 10 m² seastar

Other corner and four alternate
m² mussel beds (10 dm² sample for
check on Mytilus)

Reference

Investigator M. I nacio & L. Stenzel

notes:

see previous data sheets for algae

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 8/8 Tide/Time 7:15 am Water temp. Other tide -0.7 @ 7:18

Plot #	Oil?	Species- Algae, other	Organism Count Size-Avg. mm. (S=shells with oil)								
			<u>PISASTER</u> <u>OCHRACEOUS</u>			<u>ACMAEA</u> <u>SPP.</u>			<u>LEPTASTERIAS</u> <u>SP.</u>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
10	no	1 <u>CANCER ANTENNARIUS</u> 100 mm carapace	2	0	300	3	0	1-30	3	0	60
9	no	1 <u>C. ANTENNARIUS</u> 75 mm carapace	2	0	150-300	1	2		1	0	60
8	no	1 <u>PUGETTIA PRODUCTA</u> 50 mm carapace	3	0		1	3		1	0	
7	no		4	0		1	1		1	0	
6	no	1 <u>C. ANTENNARIUS</u>	4	0		6	2		0	0	

Year 1971 Date 8/9 Tide/Time -0.2 / 7:54 am Water temp. Other

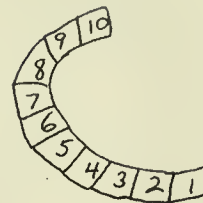
Plot #	Oil?	Species- Algae, other	Organism Count Size-Avg. mm. (S=shells with oil)								
			<u>Pisaster</u>			<u>ACMAEA</u>			<u>Leptasterias</u>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
5	no	1 <u>P. producta</u> 1 <u>C. ANTENNARIUS</u>	1			5	8	2-15			
4	no	1 <u>C. ANTENNARIUS</u>	2			4	1	"			
3	no		4			7	1	"	1		
2	no		1			26	3	"			
1	no		0			66	6	"			
Σ			23L			120L 270			7L		

TRANSECT WORKSHEET - G. Chan
January, 1971

3.4
CT-5
p2

Study Site Duxbury Reef
Area C Section 4 Channel
Transect CT-5 type 10 m² seastar
Other Corner AND 4 Alternate
M² in mussel beds (10 dm² samples
in each mussel m² as a check)

Sea
Star
Corner



① = A. fan
rest = A. ale

Reference _____
Investigator M. INACIO & L. STENZEL

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year <u>1971</u> Date <u>7/22</u> Tide/Time <u>-1.0/6:36</u> Water temp. _____ Other _____		Organism Count			Size-Avg. <u>cm.</u>			(S=shells with oil)		
		Species=			Size=			S=shells with oil		
Plot #	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead
1		<u>Pleasterias spp.</u>	3	0	15-25	669	0	10	54	0
2		<u>" 6cm.</u>	3	0	10-25	1522	0	12	13	0
3		<u>" 7cm.</u>	4	0	15-25	51	0	26	11	0
4		<u>"</u>	2	0	20-25	45	0	10	29	0
5		<u>" 7cm.</u>	1	0	20	19	0	7	4	0
6		<u>"</u>	7	0	15-20	8	0	7	0	0
7		<u>" 5cm.</u>	1	0	20	115	0	7	0	0
8		<u>" 6cm.</u>	9	0	20-25	44	0	10	0	0
9		<u>4 L " (4-10cm)</u>	1	0	20-25	29	0	13	0	0
10		<u>"</u>	1	0	25	27	0	6	0	0
<u>Σ</u>			32	0		2529	0	105	11	0

Year <u>1971</u> Date <u>7/24</u> Tide/Time <u>-0.5/7:42</u> Water temp. _____ Other _____		Organism Count			Size-Avg. <u>cm.</u>			(S=shells with oil)		
		Species=			Size=			S=shells with oil		
Plot #	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead
1	NO	<u>Tegula funebris</u> <u>Littorina scutulata</u> <u>ACMAEA, Thais</u>	635	10	All shells 5-10cm $\bar{X}=7$	40	0		66	5
3	NO	<u>T. funebris</u> <u>ACMAEA</u>	478	6	$\bar{X}=4.9$	25	0		19	1
5	NO	<u>T. funebris, ACMAEA</u> <u>Thais, Chthamalus</u> <u>Littorina scutulata</u>	288	0	$\bar{X}=3.1$	133	1		198	16
7	NO	<u>T. funebris,</u> <u>L. scutulata, Thais</u>	421	4	$\bar{X}=5.2$	7	0		69	5
<u>Σ</u>			1822	14		205	1		352	27
						$\bar{X}=51.3$				$\bar{X}=10.2$

Seastar Corner

July 23, 1971

<u>Organism</u>	\bar{X} Sample mean/M ²
<u>Anthopleura xanthogrammica</u> (5-15 cm.)	10.5
<u>A. xanthogrammica</u> (1-5 cm.)	242.4
<u>Pisaster ochraceous</u>	3.1
<u>Acmaea spp.</u>	11.1

Mussel Bed

<u>Mytilus californianus</u>	455.5
<u>Pollicipes polymerus</u>	51.25
<u>Balanus glandula</u>	88
<u>A. xanthogrammica</u>	10.25

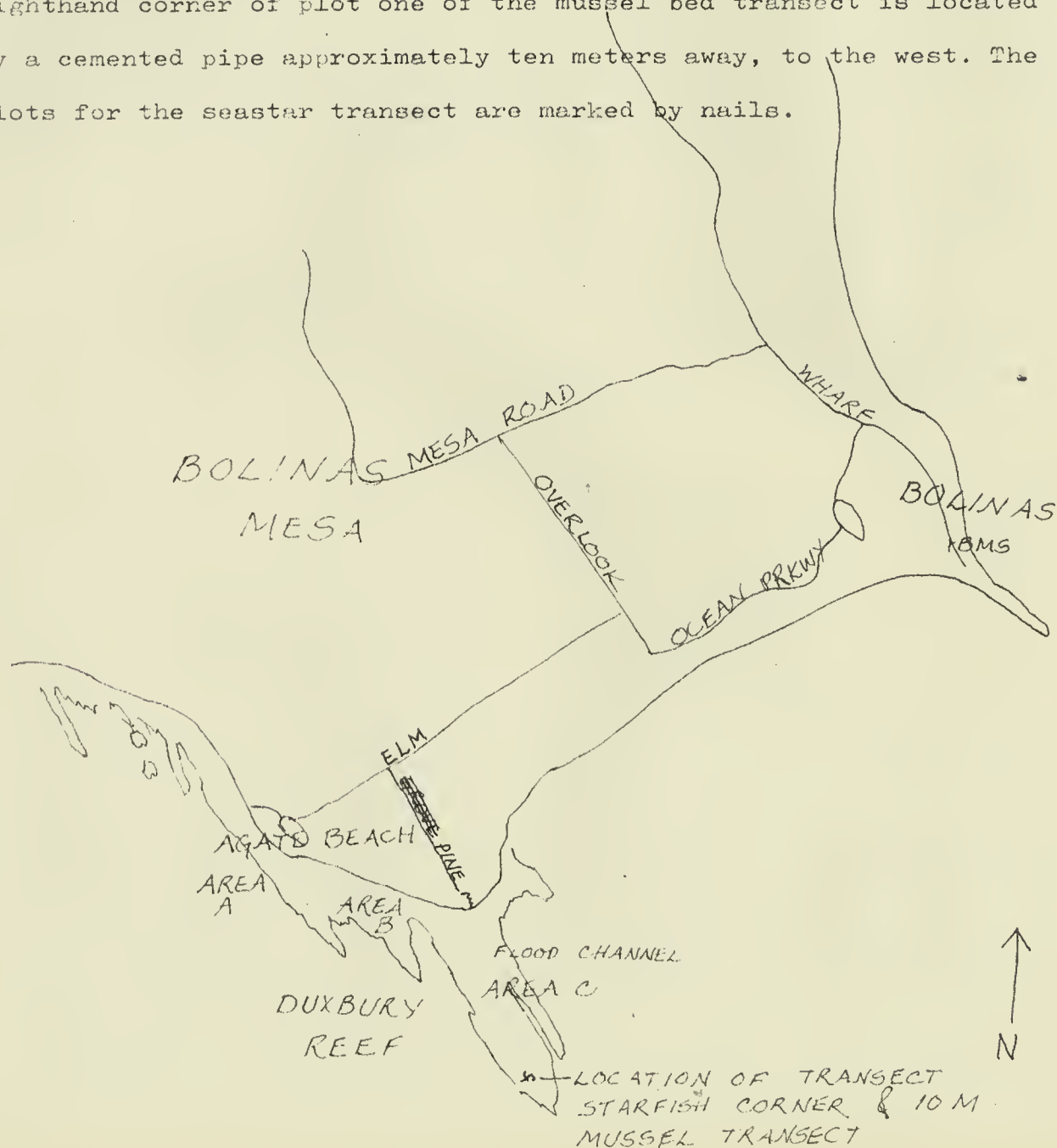
Seastar corner

August 9, 1971

<u>P. ochraceous</u>	2.3
<u>Acmaea spp.</u>	12.0

CT-5⁷
34

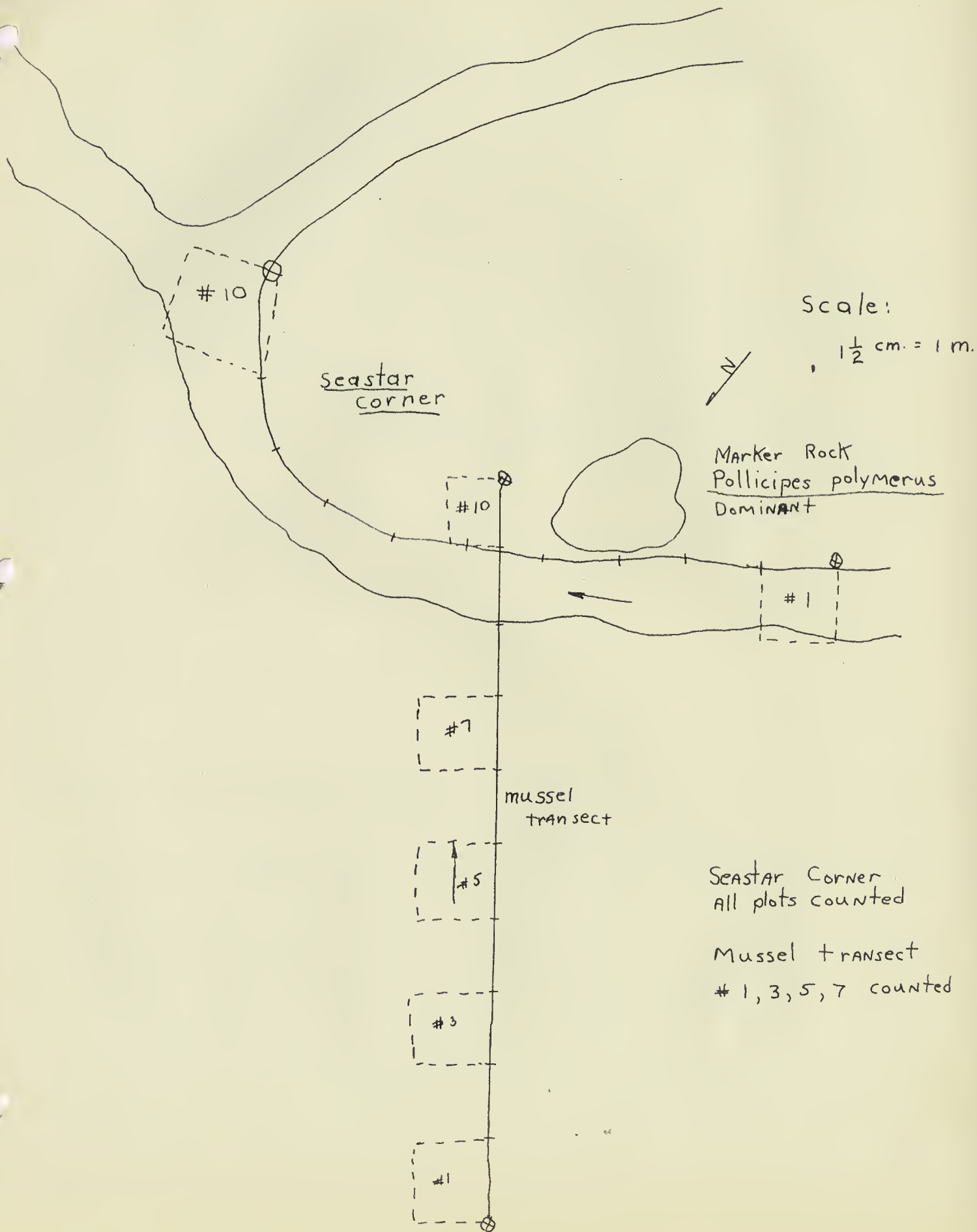
The transect area, in Area C of Duxbury Reef, can be approached most easily by turning off Elm Street at Pine and following Pine to its end. A trail to the base of the bluff is located at the beginning of Area C. Transect CT-5, at the end of the reef accessible at low tide, can be located by a prominent resistant rock which is a slightly lighter color than the rest of the area, sticks up about 18 inches from the higher bed of the reef, and is barren except for the presence of leaf barnacles. The upper righthand corner of plot one of the mussel bed transect is located by a cemented pipe approximately ten meters away, to the west. The plots for the seastar transect are marked by nails.



CT-5

Diagram

3-4



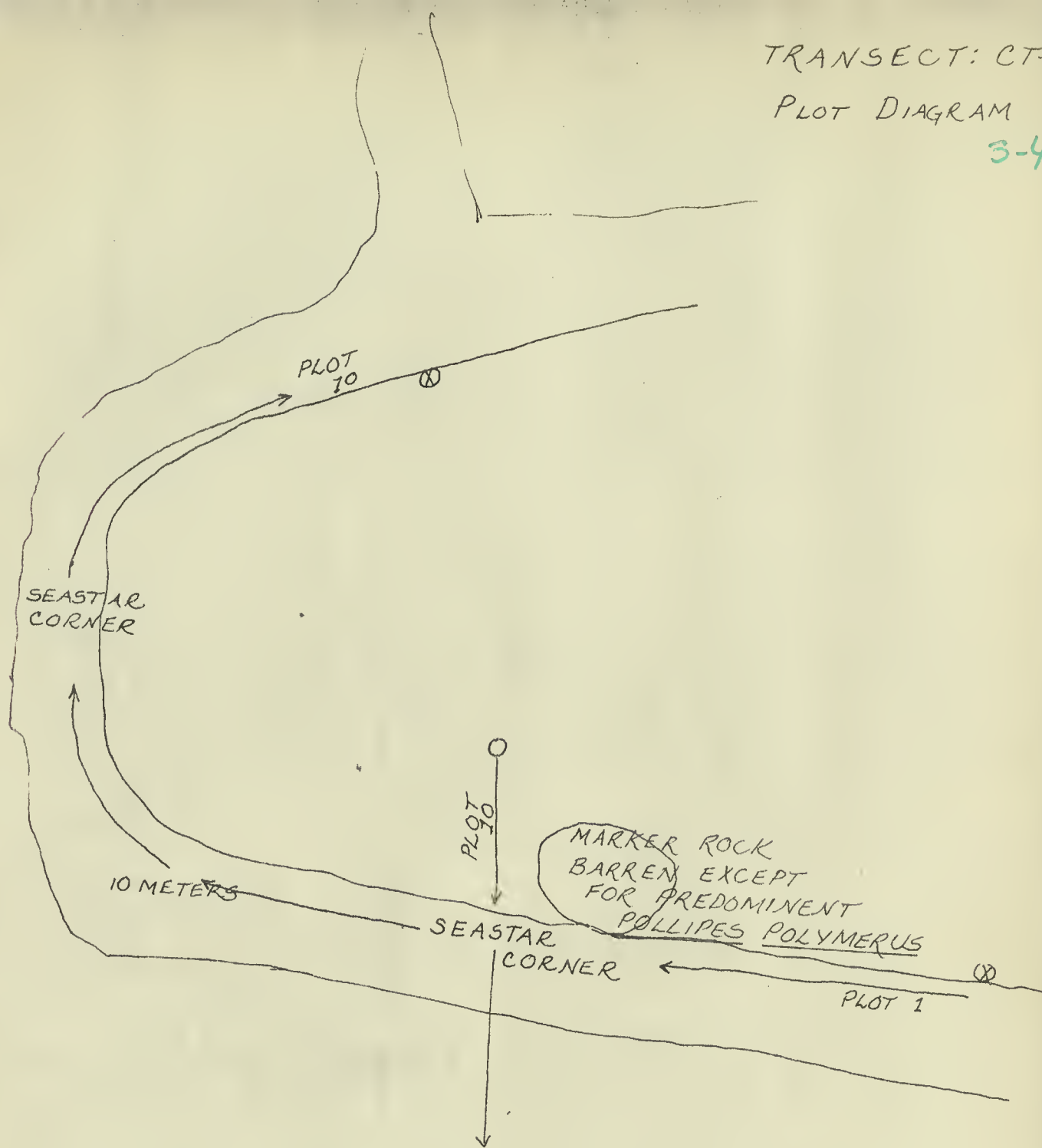
Seastar Corner
All plots counted

Mussel transect
#1, 3, 5, 7 counted

TRANSECT: CT-5

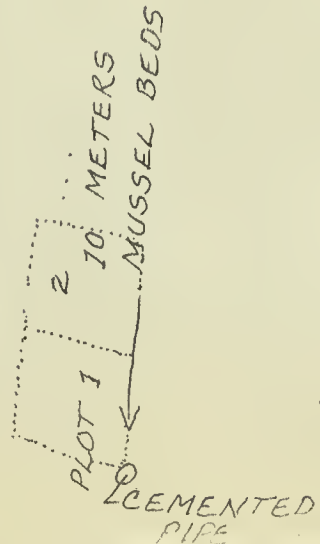
PLOT DIAGRAM

3-4



NOTE: PLOTS 1-10, INCLUSIVE, OF SEASTAR CORNER, WERE COUNTED.

FOUR ALTERNATE PLOTS, 1, 3, 5, & 7, OF THE MUSSEL BEDS, WERE COUNTED FOR MYTILUS CALIFORNIANUS & POLLICIPES POLYMERUS.




DUXBURY REEF

AREA C

MUSSEL BED

Transect DX-CT-4

 = square meter
quadrant

* = stake for each
square meter
sample

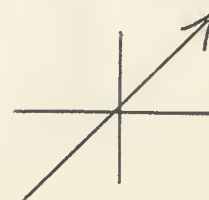
Instructions: Place quadrant
in same relation
to stake as
shown on map;

Corner of quadrant
at stakes #1 and #2--

Center of quadrant
at stakes #3-10.



magnetic
North



G. Chan

Study Site DUXBURY REEF

Area C Section 2 Channel

Transect CT-6 Type single m²

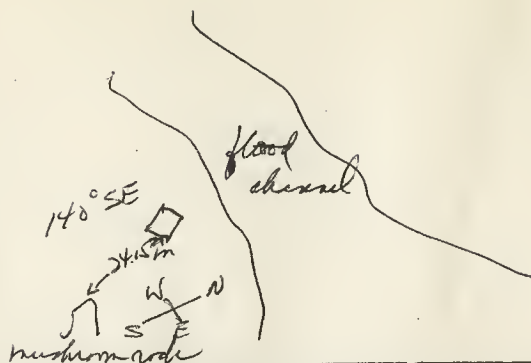
Other scrapped m² of

remains scrub for

repopulation study

Reference

Investigator Inertich, Gilbert



For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 8/10 Tide/Time Water temp 26°C Other pool

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)											
			<u>Ac. scabra</u>			<u>Teg. funicularis</u>			<u>Mopalia</u>			<u>Pagurus samuelis</u>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	not visible	Alga. 85% Fucus Zigartina sp. Halysia	3			21			0			0		

Year 72 Date 7/27 Tide/Time 0.5 4:55 Water temp 15°C Other Alga

Plot #	Oil?	Species= Algae, other	Organism Count Size=Avg. mm. (S=shells with oil)											
			<u>Ac. scab.</u>			<u>Teg.</u>			<u>Mopalia</u>			<u>Bal.</u>		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	0	Alga, Enteromorpha Fucus.	18			2			1			62		≤ 1cm.
	0	6/28/72 Zigartina Cristata only	20 scabra			78			2 Mopalia			90 Bal		
			19 Zygote (S)						5 Ac. thin			4 D		3 mm
									28 Pagurus					in small

de

3-6
DT-7
pk

Balanus
- zone -
Acanthina
- - -
Lagula

Investigator _____

Year Date Tide/Time Water temp. Other

[illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

4/29/71

myt dim?

Rolli fan Other

1	7.0	307	0	
+ 2	8.0	152	7	
+ 3	5.0	203	0	
4	6.0	336	0	4thais
5	5.0	236	10	1 mgp
6	12.0	345	0	
7	15.0	220	0	
8	15.0	180	4	
+++ 9	16.0	255	0	
10	4.0	23	10	
92.0L		2251L	31L	

5/11/71

myt

Rolli fan Other

1	8.0	100	0	
+ 2	9.0	100	0	
+ 3	5.0	100	10	1 mgp
4	6.0	300	6	
5	10.0	200	1	
6	12.0	250	0	
7	15.0	200	0	
8	16.0	150	4	
9	15.0	200	0	
10	4.0	3	0	
100.0		1603 L	21 L	

5/23/71

1	7.0	200	
+ 2	8.0	120	
+ 3	5.0	190	
4	6.0	330	(same?)
5	6.0	220	
6	12.0	340	
7	15.0	200	
8	15.0	180	
+++ 9	16.0	240	
10	4.0	7	
94.0		2027	

6/11/71

1	7.0	LOD	200	
+ 2	8.0		175	
+ 3	5.0		170	
4	6.0		330	(same?)
5	7.0	OD	227	
larvae volume 6	12.0	10D	300	
7	15.0	OD	200	
larvae volume 8	16.0	15D	165	
+++ 9	15.5	50D	235	
10	4.0	10D	5	
95.0L		85D	1627	

spitochy, slim on
dead empty shells

73

A hand-drawn sketch of a rocky shore profile. The sketch is oriented with a cliff on the left and a body of water on the right. The water area is labeled "water". The rocky shore is labeled "rocky" and "algae". A small "tide pool" is indicated by a circle. A scale bar at the bottom is marked 1 to 10, with "310° NW" and an arrow pointing right.

[illegible]

Study Site Transect #3 (Continued)

Area _____ Section _____ Channel _____

Transect _____ Type _____

Other _____

Reference _____

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 5/13 Tide/Time 9:08:30 Water temp. 11°C Other Overcast foggy

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			Mytilus Calif			Pollycipes Poly			Aureomure		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		Algae, other	700	0	8 1/3	200	0				
2			500	0	9/3	120	0				
3			500	0	8 1/2	190	0				
4			600	0	8 1/2	330	0				
5			600	0	5 1/2	220	0				
6			1200	0	4 1/2	340	0				
7			1500	0	5 1/2	200	0				
8			1500	0	4 1/2	180	0				
9			1600	0	5 1/2	240	0				
10			400	0	8 1/2	7	0				

Year 1971 Date 6/11 Tide/Time 1:30:12 Water temp. 11°C Other Clear sunny few clouds

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm.			(S=shells with oil)		
			Mytilus Calif			Pollycipes Poly			Aureomure		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
1		Healthy	700	0	8 1/3	200	0				
2		Healthy	800	0	9/3	125	0				
3		Healthy	500	0	7 1/2	170	0				
4		Healthy	600	0	7 1/2	330	0				
5		Healthy	700	0	6 1/2	227	0				
6		Area with slime	1200	10	4 1/2	300	0				
7		Healthy	1500		5 1/2	200	0				
8		Area with slime	1600	15	5 1/2	165	0				
9		Spotty 1 to 2 dead	1500	50	5 1/2	235	0				
10		Good health	400	0	8 1/2	5	0				

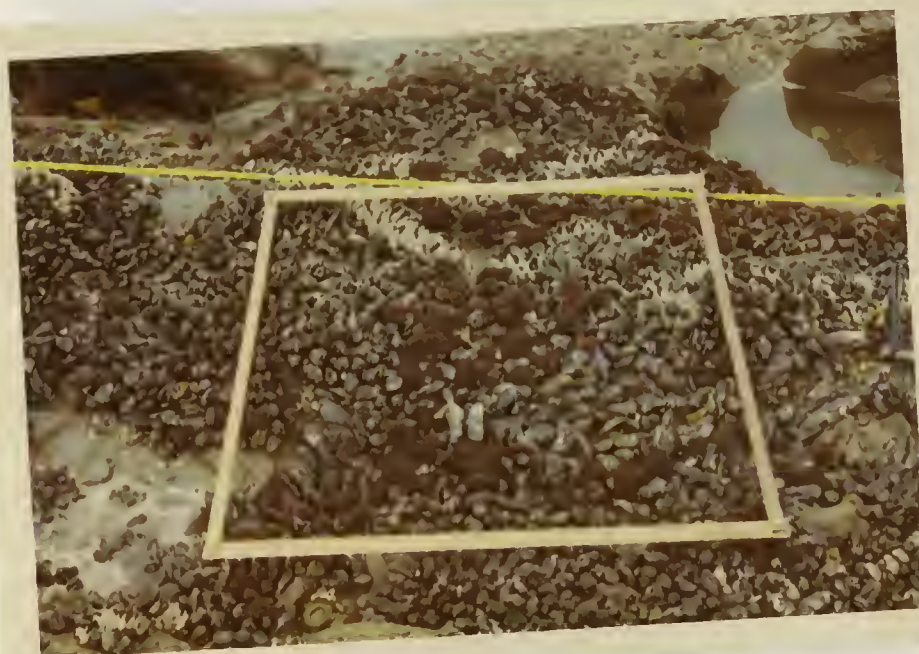
General
limb
wood
with slime on
dead empty
shells.

CT-3

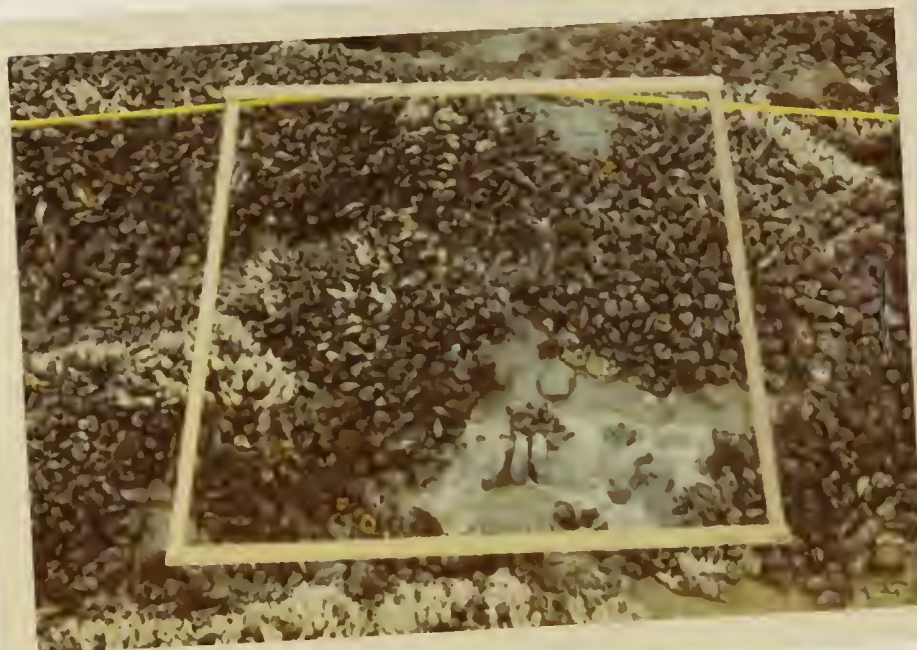
#1



#2



#3



CT-3

C

#4



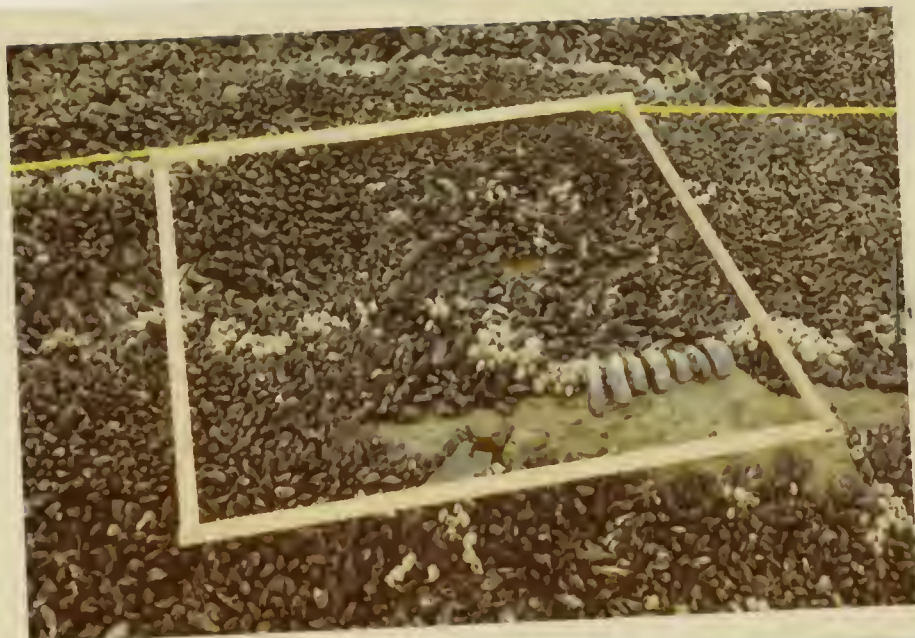
#5



#6



#7



#8

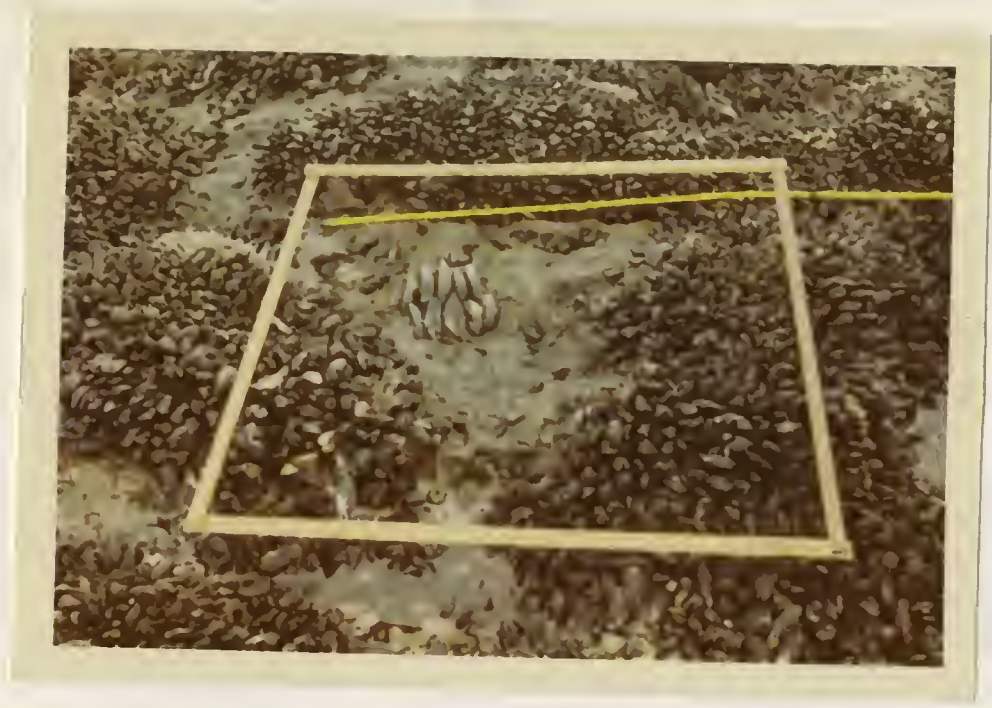


#9



CY-3

#10



Pictures were taken 4/30/71 at beginning
of study.

mussel strip
succession

DATA SUMMARY for Study Site DUXBURY REEF Transect CT-4a Oil? _____ n= _____ p. _____

L= live
D= dead; += scars
S= oil on shells
T= on top of oil
N= no oil on shells

Year	Date	Organisms					
			per	per	per	per	per
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					
		\bar{X} /unit					
		size					
		change					

TRANSECT WORKSHEET - G. Chan

Location - Site Title DUXBURY

Area C Section 4 Transect _____

Other Mussel succession

Strips 1, 2, 3, 4

(15 feet long strips
by 1 foot width)

Reference

Chan Notes

Conserv. of Dux, p. 27

(Chan = Wilson
No. 2 = X_{10} ; No. 3 = X_{11} ; renamed X_{2-10} , X_{3-11})

CT4a

~~E-S-4~~

TREATMENT STRIPS

Strip 1

2

3

m² patch No. 1

tide pool

4

X_{10}/m^2

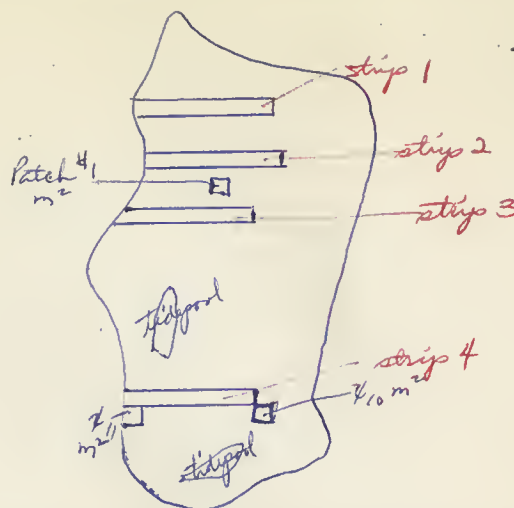
tide pool

X_{11}/m^2

Year	Date	Tide	Other conditions	Plot, Strip	Description
1957	12/2			A	A. Cleared Mussel Strips, 1 foot wide, 15 feet long — strips 1, 2, and 3
				B	B. Cleared Mussel Patch No. 1, m ²
1967	12/4			C	C. After 10 years, strips 1, 2, and 3 plus Patch No. 1 was reconstituted by mussels. Patch No. 1 has 840 mussels, 1500 " " " " " "
1971	3/23		10 DM ² AUG. 15	D	
1965	12/5			B	D. Cleared Strip No. 4, 1 foot wide, 15 feet long to repeat A
			Temperature of m ² X 11		Test 10 mussels with oil $\bar{X} = 21.5^{\circ}\text{C}$ " " " without " $\bar{X} = 21^{\circ}\text{C}$ used Thermistor probe

CT-4a

Investigator _____

[illegible]

<i>Driftlus californianus</i>			Organism Count			Size=Avg. mm. (S=shells with oil)									
Plot #	Species=		Strip 1			Strip 2			Strip 3			Strip 4			
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	
		Patch #1													
	1957	12/2 cleared	cleared mussels			cleared			cleared			cleared			
	1965	12/5										cleared			
	1967	12/4 ← S840	oil reconstituted by mussels →												
	1971	3/23 10 dm ² X 815 = 1500 ±													
			30 x 8 cm			#1 25 kg	#1 24 x 8 cm			100 kg			Congelated mussels		
			30 x 8 cm			#2 51	#2 5 Bd 10 Bd			50 Bd 10 Bd			50 Bd 10 Bd		
			10 x 12 cm			10 x 12 cm	90 x 20 cm			#3 20 kg			100 kg		
						#3 50 kg	130 x 70 cm			50 kg 2 cm			100 kg 80 Bd		
			6 x 8 cm			2 x 10 cm	2 x 10 cm			2 x 10 cm			55 Lcm spp		
			#4												
			6 x 8 cm												

[illegible][illegible]

L= live
D= dead; += scars
S= oil on shells
T= on top of oil
N= no oil on shells

		Organisms					
Year	Date		per m ²	per m ²	per	per	per
		\bar{X}/unit					
		size					
		change					
1970	7/17	\bar{X}/unit	3,100.4	149.4			
	n=8 m ²	Σ	24,803	135			
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					
		\bar{X}/unit					
		size					
		change					

TRANSECT WORKSHEET - G. Chan

Location - Site Title DUXBURY

Area C Section 2 Transect _____

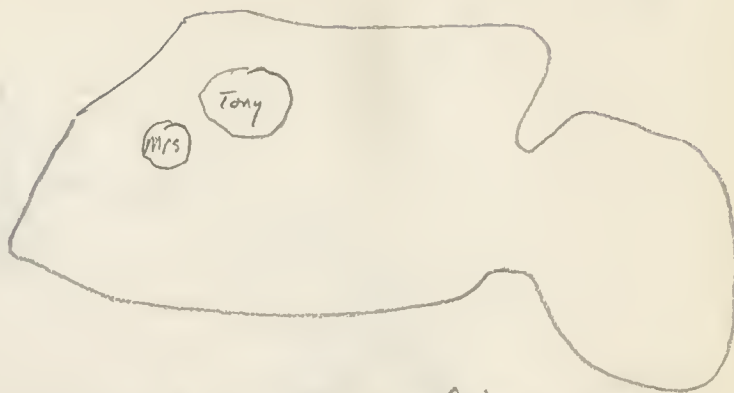
Other Tony's tide pool

Reference

Chan's notes

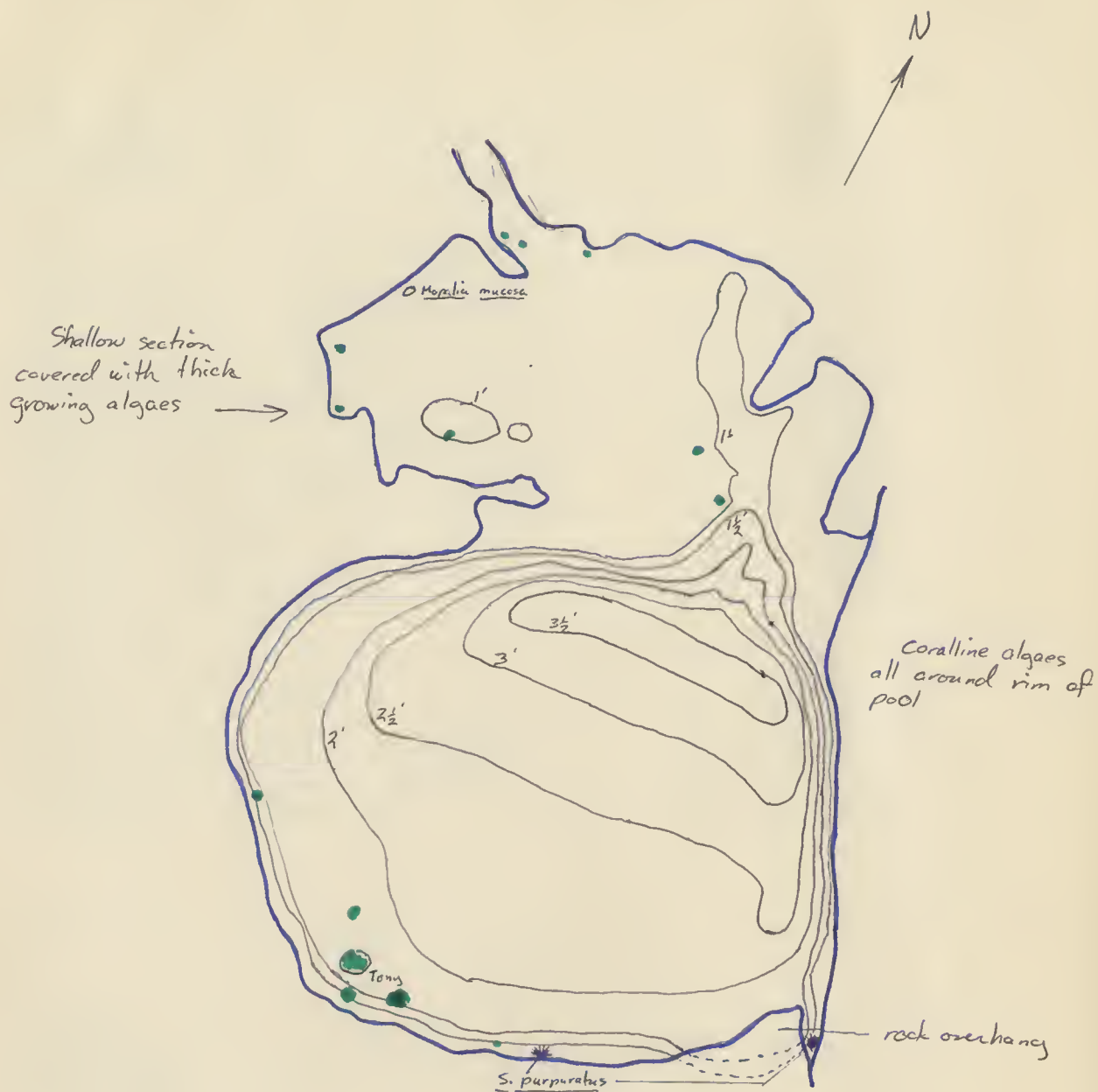
Chan/melia Conser. of Duxbury Reef, P.R.

Tide Pool C-Tony
CT-8



Massaged anemone with fingers, used calipers to measure the diameter.

Year	Date	Tide	Other conditions	Plot, Strip	Description									
			clear weather	-	<u>Anthopleura xanthogrammica</u>									
					<table><tr><th><u>Column Diameter</u></th><th><u>Circumference (from TI)</u></th><th><u>longest tentacle</u></th></tr><tr><td>6"</td><td>18.8"</td><td>2"</td></tr><tr><td>8"</td><td>25.1</td><td>2.5"</td></tr></table>	<u>Column Diameter</u>	<u>Circumference (from TI)</u>	<u>longest tentacle</u>	6"	18.8"	2"	8"	25.1	2.5"
<u>Column Diameter</u>	<u>Circumference (from TI)</u>	<u>longest tentacle</u>												
6"	18.8"	2"												
8"	25.1	2.5"												
958	6/2													
968	11/19													
971	1/23													



Contour lines show approximate depths in 6 inch steps.

Bottom of pool covered with large rounded stones. Main organism is hermit crab and occasional sculpin.

- *Anthopleura xanthogrammica*
- *Strongylocentrotus purpuratus*

List of organisms found in pool from 3/6/71
to 6/10/71

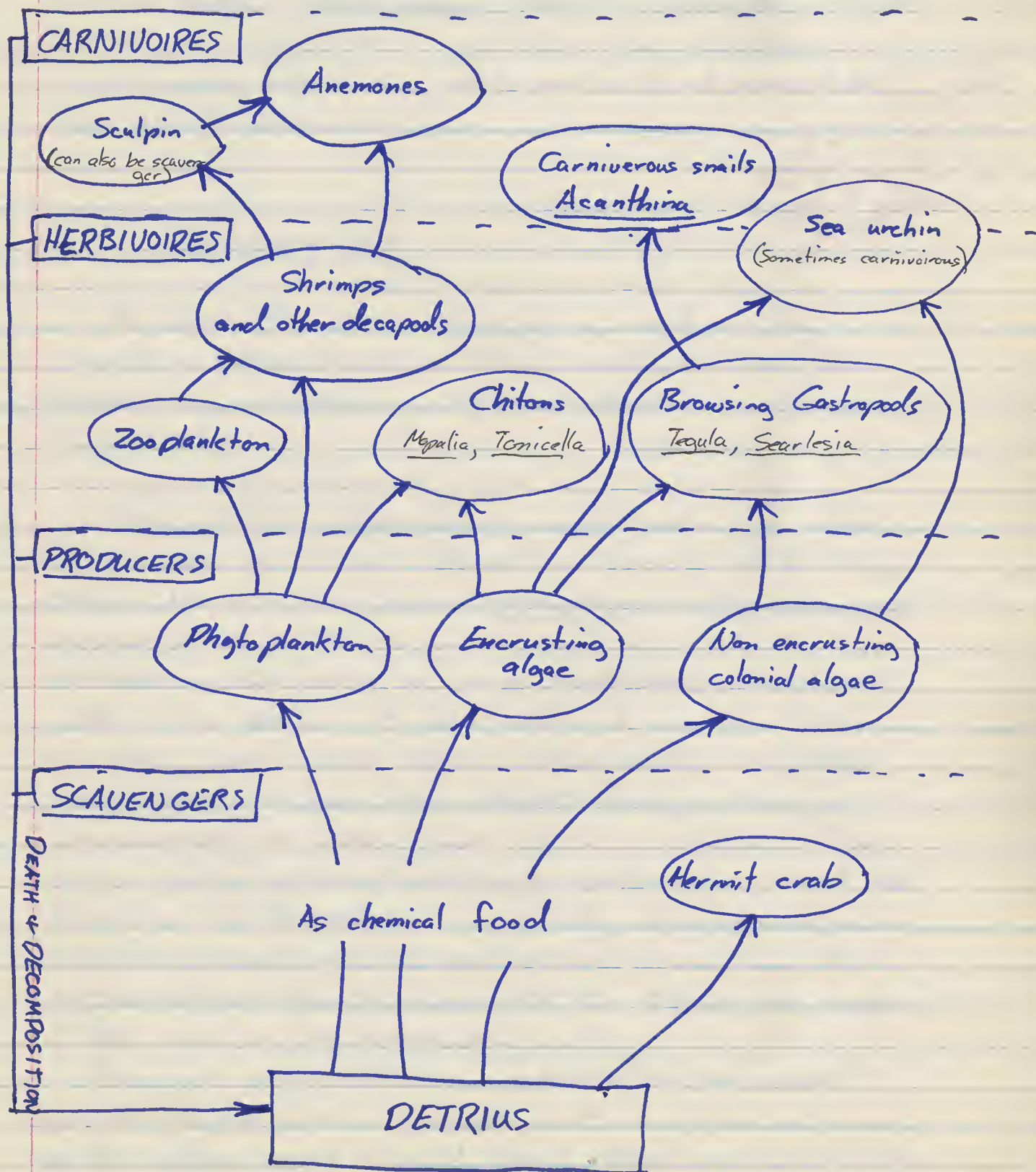
<u>Anthopleura xanthogrammica</u>	green sea anemone
<u>Tegula funebris</u>	black turban
<u>Acanthina spirata</u>	
<u>Searlesia dira</u>	dire whelk
<u>Tonicella lineata</u>	lined chiton
<u>Mysalia mucosa</u>	mossy chiton
<u>Botula californiensis</u>	rock boring clam
<u>Spirontocaris sp</u>	shrimp
<u>Pagurus hemphillii</u>	hermit crab
<u>Strongylocentrotus purpuratus</u>	purple sea urchin
<u>Oligocottus maculosus</u>	tidepool sculpin

< List of algae to be found

<u>Lithothamnion sp</u>	Coralline algae
<u>Calliarthon sp</u>	" "
<u>Corallina sp</u>	" "
<u>Gigartina sp</u>	
<u>Endocladia sp</u>	Encrusting algae

Phytoplankton

Simplified food chain for Tony's Pool



Other associations of A. xanthogrammica include the sea spider Pycnogonura stearnsi, whose larva feed on the juices of its host; and the giant amoeba Trichamoeba schaefferi, which can be found around the base of the anemone.⁵

include this data
with your final
report. ↓

OBSERVATIONS

My observations are in two parts, part one for long term observations on "Tony", and part two for observations and experiments on other anemones on June 7, 1971.

Tony, or Toni, depending on what gender you think it is, lives in a large tidepod on area C of Duxbury Reef. It is a very large Anthopleura xanthogrammica, measuring over 40 cm in circumference at the base. It lives in 20 inches of water attached to the south end of its pool. My first observation was March 6, 1971, and since then I have made six others. In all cases it has been closed, leaving a hole just large enough for siphonoglyph water circulation. There are no bits of shells attached to its epidermis as most other anemones in the area have, especially those exposed to air. In all my observations the pool water temperature has not varied more than 2° from 12° C. Tony's temperature is the same as the surrounding water. ✓

Tony get very little sun attached to the south end of the pool, so it probably isn't as green as some of the others, and also it stays closed most of the time.

5. Ricketts and Calvin, Between Pacific Tides pp 52, 320

My conclusions with Tony are that he is old and tired, and doesn't have the get up and go of the younger Anthopleura. Since he is quite large, he is capable of taking larger prey, which may account for his being closed so often, because he requires less food, and takes more time in digesting larger prey.

many people know him & try to force feed him. Perhaps he is conditioned!

On June 7, at the -0.6 tide at 5:30 AM I came out to Duxbury to perform some experiments and make observations of other ~~an~~ Anthopleura xanthogrammica.

My first one was to test light reaction. At 5:30 it was still very dark. I first shined a bright flashlight on an anemone that was closed; Tony. After three minutes there was no visible reaction.

Next the procedure was repeated using anemones that were half open, and totally open. There was a slight waving of tentacles with the half open one, and no visible reaction from the totally open one. My conclusion is that Anthopleura xanthogrammica has no reaction to light, or is very slow at responding. Perhaps intensity of the order of magnitude the sun has is necessary for a reaction, but there was no change in any of these three after sunrise dimmed by fog. } agreed.

My second ~~at~~ observation involved taking the temperatures of sea anemones in the water, and exposed to air. The air temperature was 51°F with no direct sunlight to warm the water or exposed rock. The water temperature in small pools with anemones was 51°F also. The temperature of anemones both in the air and the water were no more than half a degree from 51°F . My conclusions are that anemones have such a low rate of

metabolism that it is not capable of being recorded in temperature using an ordinary thermometer.

For my third observation I counted anemones to see ~~how many~~ what percentage were closed, half open, or fully open at low tide. I did this for twenty submerged in water, and twenty exposed to air.

In the twenty ones in the water, approximately 30% were shut, 50% half open, and 20% totally open.

For the exposed ones, 95% were shut, 5% were partially open, but none were more than half open.

I concluded that the main factor involving whether an anemone is open or not is the water level.

At high tide I would expect that 95% of those anemones ~~shut~~ that were exposed to air at low tide would open.

after Hedy path
observations.

For my final observation or experiment I took bits of shell and placed them on exposed parts of anemones both above and below water. I intended to find out how long it would take for them to adhere. At the end of a half hour they were not attached in either case. My conclusion was that it must take possibly several hours, the period necessary for a loose shell to be undisturbed by wave action at low tide, which is the only time it could be adhered to.

or when mucous is
heavily secreted.

My conclusions in writing this paper are that sea anemones are really more impressive than one would think the first time he saw one. Anthopleura xanthogrammica is a very advanced coelenterate. It has no predators and may even outlive human beings.

★ Samcoars eat them!

CT-8

pl

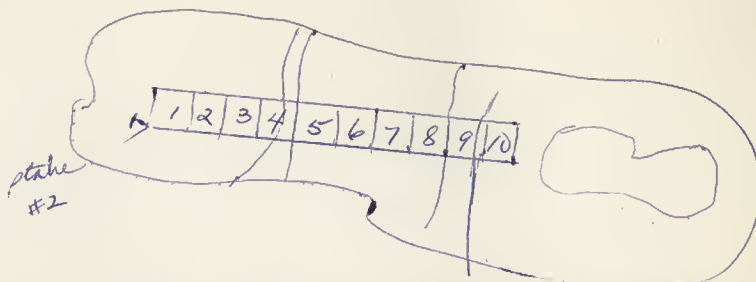
Area C Section Channel

Transect CT-8 Type 10 m² plots

Other Stake #2

Reference

Investigator _____



Year 1977/Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

CT-9

72

一

Transect CJ-9 Type alternate (odd) $5m^2$

Other Sea Urchin ^{4210 m² transect} transect

Line laid E-W, sampling
on north side of line

Reference Michael Meredith, Chan

Investigator _____

West

9	7	5	3	1
---	---	---	---	---

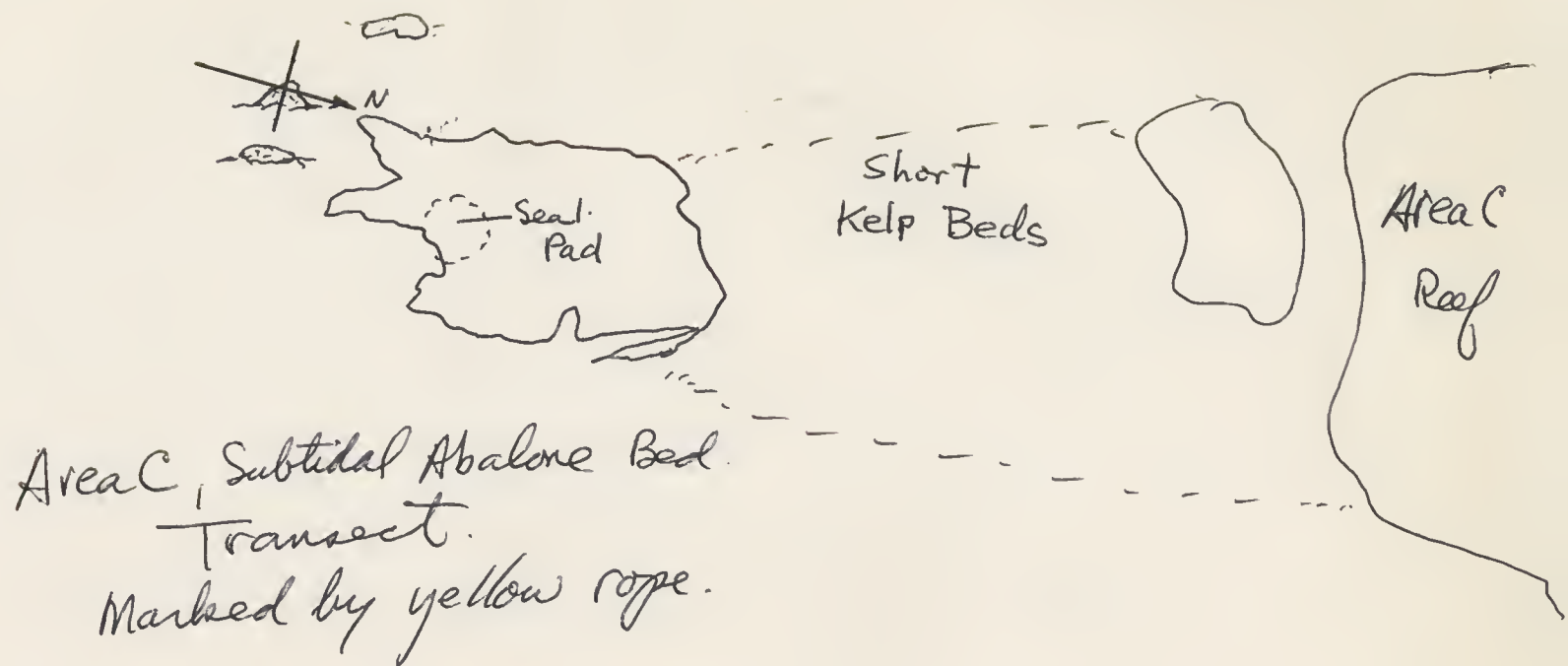
 East

Year 197/Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

			Organism Count Size= Avg. mm. (S=shells with oil)											
Plot #	Species=													
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size





Shark Tooth Rock Abalone Transect.
Marked by yellow rope

Area B
Reef

Area C Reef

~~✗~~ Tony's
pool

CT-14

CT-15
p2

Investigator Sp1 = Zuercher[illegible][illegible][illegible]

CT-15^x
p3

Investigator _____

see map

[illegible]

C-7-15

pi

Area C	Section	Channel
---------------	---------	---------

Transect _____ Type _____

Other CZ4, M² EVERY 50 METERS

CZ 2, M² EVERY 25 METERS

Reference

Investigator CARL ZEICLER

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date July 23 Tide/Time ^{-0.8} / 6:42 AM Water temp. 55°F Other _____

ZONE 4 JULY 24

-0.5 / 7:12 AM

Organism Count Size-Avg. mm. (S-shells with oil)

[illegible]

Year 1971 Date July 25 Tide/Time 0.0 / 7:42^{AM} Water temp. 59°F Other _____

ZONE 2 JULY 27

$$1.0 \sqrt{8.42} \text{ A}$$

Organism Count Size= Avg. mm. (S=shells with oil)

[illegible]

► AREA C

- 1. SEA URCHIN TRANSECT C²Z₄, 10 PLOTS
 - S. purpuratus LIVE \bar{X} = 15.2/m²
 - DEAD \bar{X} = 0/m²
 - ALGAE _____ \bar{X} = 82%/m²
 - OIL _____ = NONE

- BORING CLAM TRANSECT CZ₂, 10 PLOTS
 - LIVE CLAMS ————— $\bar{x} = 7.3/m^2$
 - DEAD CLAMS ————— $\bar{x} = 2.3/m^2$
 - ALGAE ————— $\bar{x} = 82\%/m^2$
 - OIL : PLOTS 8, 9, 10 ————— = LESS THAN 25%
PLOTS 1, 2, 3, 4, 5, 6, 7 = NONE

- \bar{X} OF ALGAE FOR 20 PLOTS = $82\%/m^2$

- 4 -

6	NO	90%	65L	OD
5	NO	95%	39L	OD
4	NO	95%	0L	OD
3	NO	90%	20L	OD
2	NO	25%	0L	OD
1	NO	95%	26L	OD
		<u>815 + 10</u>	<u>152L</u>	<u>OD</u>
		$\bar{x} = 82\%$	$\bar{x} = 15.2L$	<u>OD</u>

Year 1971 Date July 25 Tide/Time 0.0 / 7:42 AM Water temp. 59°F Other _____

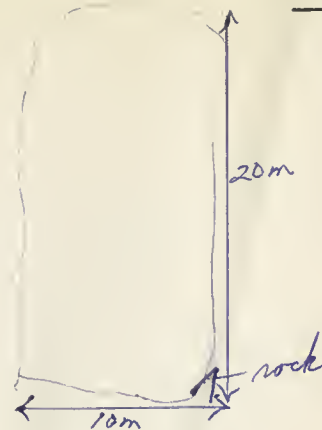
ZONE 2 JULY 27

1.0 / 8:42 AM Organism Count Size= Avg. mm. (S=shells with oil)

[illegible]

TRANSECT WORKSHEET - G. Chan
January, 1971

Study Site DUXBURY REEF
Area C Section 3 Channel _____
Transect CT-10 Type Swamp
Other 10m X 20m
total count of owl limpets
for entire area
Reference _____
Investigator _____



37
CT-10
P1

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 2/2 Tide/Time _____ Water temp. _____ Other _____

		Organism Count Size=Avg. mm. (S=shells with oil)												
Plot #	Species=		<i>Lotha gigantea</i>											
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
		1971 7/23	22											
		-0.2 3/5 @ 1:30 PM	19											
		7/23	11			<i>B. Swartberg</i>								

Year 72 Date 4/16 Tide/Time 1:57 7:23 AM Water temp. 15.9 Other Clear

Year <u>72</u> Date <u>7/14</u>		Organism Count Size= Avg. mm. (S=shells with oil)									
Plot #	Oil?	Species= Algae, other	<u>Lottoia</u>								
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
		<u>Oto+</u>	<u>31</u>		<u>Total count</u>						
		<u>plus</u>	<u>6</u>		<u>total count near CT-2 Ridge - Big</u>						<u>Dead OK</u>
	<u>72</u>	<u>6/28 overcast</u>	<u>36</u>		<u>+ CT-10</u>						
			<u>6</u>		<u>CT-12 Ridge + Big</u>						<u>Dead OK</u>

me

Investigator _____

[illegible]

unc

TRANSECT WORKSHEET - G. Chan
January, 1971

3-9
CT-12
p1

Study Site DUXBURY REEF

Area C Section 1 Channel 1

Transect CT-12 Type Pierre single m²

Other 1mm nylon mesh, washed
sand in buckets of sea water - Count heads.
Replaced onto sand.

Reference _____

Investigator _____

□ m² of Saccoglossus sp.

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 7/10 Tide/Time -1.20 Water temp. _____ Other clear

			Organism Count Size=Avg. mm. (S=shells with oil)												
Plot #	Species=		Live			Dead			Live			Dead			
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	
single	m ² , 10 cm deep	<i>Saccoglossus</i>	20												

Year 72 Date 7/16 Tide/Time -1.4 7:23 Water temp. 50 Other clear

		Organism Count Size= Avg. mm. (S=shells with oil)												
Plot #	Species=		<i>Saccoglossus</i>											
	Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	0	parts/ =	33											
	72	6/28 =	30											

unc

CT-13, 14, 15

A hand-drawn map on a piece of paper. The map shows a large irregular shape on the left, possibly a pond or lake, with a line extending from it towards the center. The line is labeled "Seal pond" in cursive. To the right of this line, there are several small, irregular shapes, some of which are labeled "X" and "Seal". A diagonal line runs from the bottom left towards the top right, separating the "Seal pond" area from the "Seal" area. The date "4/30/71" is written at the bottom left. The word "Seal" is written in cursive near the bottom right. There is also a small "X" mark near the top right.

[illegible]

3-11
CT-14, 13, 8
p1

Other Shark ^{Tooth} Rocks

Investigator _____

Year 1971 Date 7/8 Tide/Time _____ Water temp. _____ Other _____

[illegible]

Year Date Tide/Time Water temp. Other

[illegible]

3-11
BR-1
p1

Other South Bolinas Pt. Reef

Investigator _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

Year Date Tide/Time Water temp. Other

[illegible]

SA
FB
—
SB
DB

TRANSECT WORKSHEET - G. Chan
January, 1971

Study Site FORT BAKER

Area _____ Section _____ Channel _____

Transect FB-1 Type 5 dm² samples in

Other each m²

North Tower 1st chain link fence, pier through Ft Baker

Ft Baker Lagoon Blocks

Reference 1 2 3 4 dm² samples

Investigator transect line laid on higher level of rocks than rocks near water (3rd line yards)

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

Organism Count Size-Avg. mm. (S=shells with oil)

Plot #	Oil?	Species= Algae, other	Organism Count			Size-Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
<i>ocean side of transect line</i>											

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

Organism Count Size-Avg. mm. (S=shells with oil)

Plot #	Oil?	Species= Algae, other	Organism Count			Size-Avg. mm.			(S=shells with oil)		
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size

*Golden Gate
Tower
space*

Ft Baker

5.1

Golden Gate Bridge

Painted range

*8 ft post
from ocean
gate post*

pier

road from pier

Overview

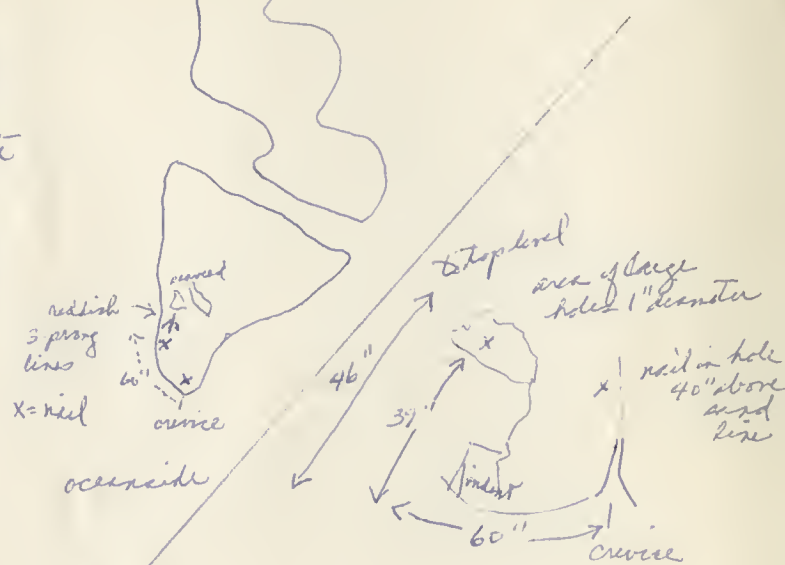
diff side

DB-3

Area _____ Section _____ Transect 2 Sidepool

Other Soil near seaward is not quite
at highest level of tide pool level,
about 8" beyond reddish marks
on top of island

Reference

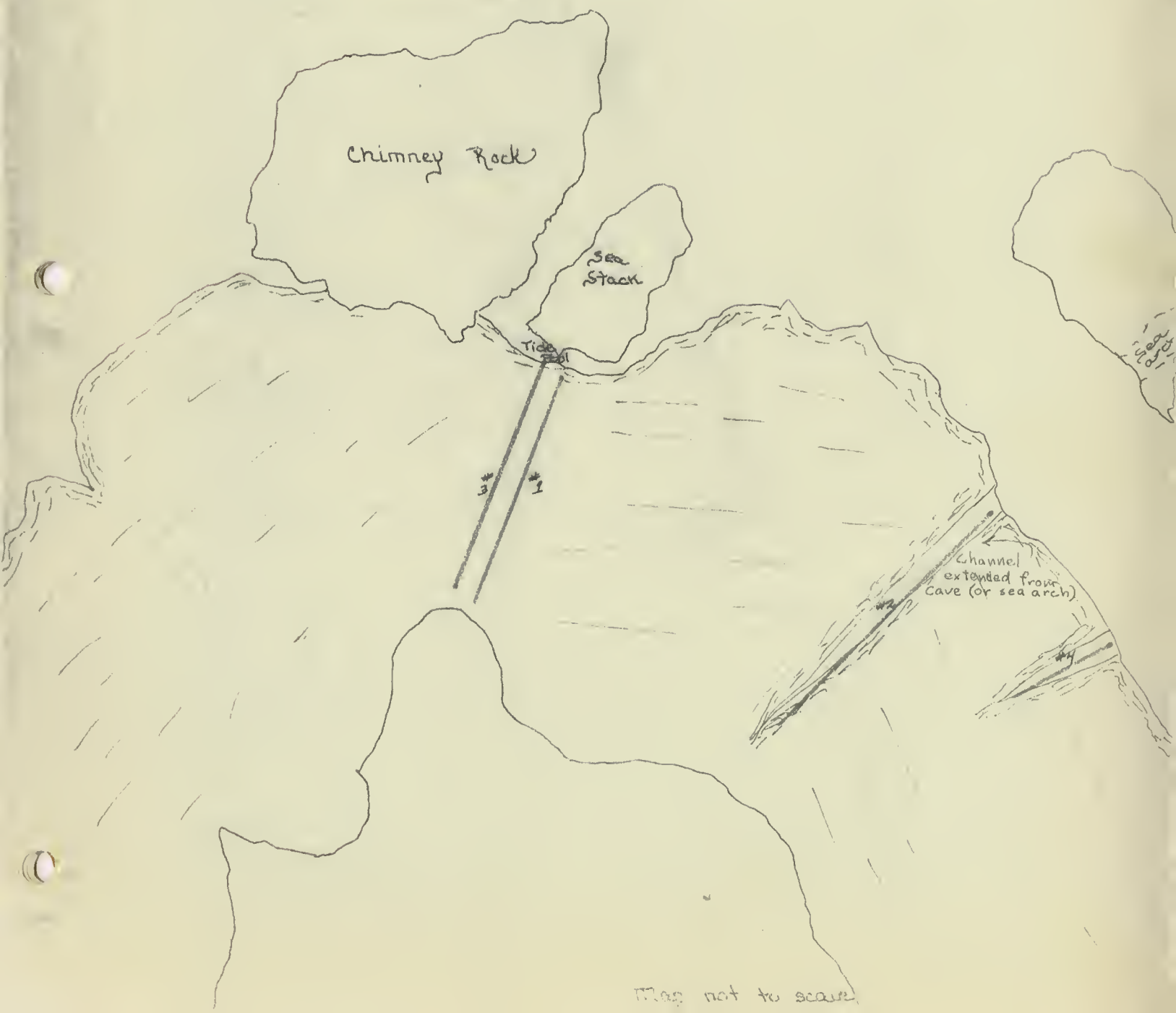
[illegible]

C
R,
B
R,
D
P

OR-1, 2, 3, 4
~~OR-1, 2, 3, 4~~

Intertidal

20 meters



Map not to scale

DATA

Porifera

Leucoselinia healthi

Coelenterata

Anthopleura elegantissimaAnthopleura xanthogrammicaEpiactis prolifera

Annelids

Glycera americanaSabella vermicularis

Arthropoda

Pagurus samuelisPagurus hirsutiusculusPugetila productaPycnogonum stearnsiCancer antonariusPetrolisthes cinctiposMacalogastrus cavicaudaBalanus glandulaIdothea vesicataDemigrapsus nudus

Mollusca

Haliotis rufescensLittorina ulanaxisLittorina scutulataTegula funebrisAcmaea limatulaAcmaea digitalisAcmaea scabraCryptochiton stelleriMopalia lignosaAcmaea scutumThais emarginataAcmaea mitraTegula brunneaMinimites multirugosusThais lamellosaCrepidula adunca

Echinodermata

Patiria miniataAsterias aquillusStrongylocentrotus purpurusLycnopus helianthoidesPisaster ochraceus

	# of quadrats sampled	Total # of specimens	\bar{x}	$\left(\sum_{i=1}^n x_i\right)^2$	$\sum_{i=1}^n x_i^2$	S^2	S	Confidence Interval
	62	1.838		3,844	1,723	50.203	7.085	$-.537 \leq \mu \leq 4.195$
	7	.212		49	21	.609	.78	$-.053 \leq \mu \leq .477$
	46	1.393		2,116	890	25.808	5.080	$-.339 \leq \mu \leq 3.125$
	1	.03		1	1	.03	.173	$-.028 \leq \mu \leq .088$
	3	.09		9	9	.272	.521	$-.087 \leq \mu \leq .267$
	47	1.424		2,209	385	4.939	3.152	$.35 \leq \mu \leq 2.498$
	12	.363		144	122	3.676	1.917	$-.29 \leq \mu \leq 1.06$
	8	.292		64	18	.501	.707	$-.001 \leq \mu \leq .483$
	27	.818		729	321	9.340	3.056	$.409 \leq \mu \leq 1.227$
	5	.151		25	9	.251	.506	$.084 \leq \mu \leq .218$
	36	1.646		3,136	5136	45.030	9.748	$.390 \leq \mu \leq 3.002$
	2	.06		4	2	.058	.240	$.029 \leq \mu \leq .096$
	3488	105.696		12,166,144	6,395,684	189,344.185	433.986	$47.54 \leq \mu \leq 163.850$
	4	.121		16	10	.297	.544	$.049 \leq \mu \leq .193$
	17	.515		289	227	6.820	2.611	$.166 \leq \mu \leq .864$
	20	.606		400	120	3.371	1.836	$.360 \leq \mu \leq .852$
	2590	78.484		6,208,100	1,997,300	54,063.152	236.776	$46.757 \leq \mu \leq 110.211$
	30	.909		900	404	11.772	3.431	$.510 \leq \mu \leq 1.368$
	151	4.575		22,801	5835	160.751	12.678	$2.877 \leq \mu \leq 6.273$
	24	.727		576	576	17.454	4.177	$.168 \leq \mu \leq 1.286$
	41	1.242		1,681	925	27.314	5.226	$.542 \leq \mu \leq 1.942$
	89	2.696		7,921	2,991	85.967	9.271	$1.454 \leq \mu \leq 3.938$
	8	.242		64	14	.376	.613	
	7	.212		49	17	.484	.695	$.130 \leq \mu \leq .294$
	15	.454		225	225	6.818	2.611	$.105 \leq \mu \leq .803$
	76	2.303		5,776	5,620	170.155	13.044	$.559 \leq \mu \leq 4.050$
	3	.09		9	9	.272	.521	$.021 \leq \mu \leq .159$
	3	.09		9	9	.272	.521	$.021 \leq \mu \leq .159$
	2	.06		4	4	.121	.347	$.014 \leq \mu \leq .106$
	3	.09		9	9	.272	.521	$.021 \leq \mu \leq .159$
	10	.303		100	52	1.536	1.236	$.138 \leq \mu \leq .468$
	9	.172		81	17	.454	.673	$.182 \leq \mu \leq .362$
	44	1.333		1,936	322	8.229	2.868	$.949 \leq \mu \leq 1.717$
	54	1.636		2,916	1642	30.558	5.527	$.896 \leq \mu \leq 2.376$
	6	.181		36	8	.215	.463	$.119 \leq \mu \leq .243$
	10	.303		100	18	.405	.636	$.218 \leq \mu \leq .388$

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970

Specific Area _____

Tide -.2 Time 8:48amBaseline Intervals _____
metersTRANSECT NO. 1Recorder Karin O'BrienX₂X₄X₆X₈X₁₀(Scientific name
and numbers of
each organism)

FLORA

Iridaea splendens
Spongomorpha
Gigartina
cristata
G. canaliculata
Ralfsia
Corallina
Phyllospadix
Ulva

FLORA

Iridaea splendens
Gigartina
cristata
G. canaliculata
Spongomorpha
Corallina
Egrecia
Ulva

FLORA

Iridaea splendens
Gigartina
cristata
G. canaliculata
Ralfsia
Corallina
Phyllospadix
Ulva

FLORA

Iridaea splendens
Gigartina
cristata
G. canaliculata
Ralfsia
Phyllospadix
Ulva

FLORA

Egrecia
Gigartina
cristata
G. canaliculata
Egrecia
Ulva

FAUNA

Balanus
glandula (78)
Epiactis
porrifera (3)
Cancer
antennarius (1)
Pagurus
samuelis (5)
Strongylocentrotus
pupuratus (2)
Leptasterias
aequillis (2)
Haliotis
rufescens (1)

FAUNA

Balanus
glandula (150)
Pagurus
samuelis (1)
Pugettia
producta (3)
Heptasterias
pusilla (3)
Pycnogonid
stearnsi (14)
Littorina
planaxis (10)

FAUNA

Balanus
glandula (150)
Pagurus
samuelis (1)
Anthopleura
elegantissima (7)
Idothea
rescata (3)
Tegula
funnebralis (19)
Hemigrapsus
nudus (1)
Pagurus
hirsutiusculus (1)
Pycnogonid
stearnsi (11)

FAUNA

Balanus
glandula (300)
Acmaea
limintada (24)
Acmaea
digitalis (14)
Acmaea
scabra (7)
Pagurus
hirsutiusculus (1)
Tegula
funnebralis (1)
Pagurus
samuelis (12)
Pisaster
ochraceous (1)

FAUNA

Cryptochiton
stelleri (2)
Strongylocentrotus
pupuratus (5)
Haliotis
rufescens (1)
Tegula
funnebralis (7)
Sabella
vermicularis (3)
Leptasterias
aequillis (1)
Pisasterochraceous
(2)
Petrolisthes
cinctipes (56)
Hemigrapsus
nudus (15)
Pagurus
samuelis (4)

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970Specific Area Tide -.2 Time 8:48amBaseline Intervals
metersTRANSECT NO. 1Recorder Karin O'BrienX 12X 14X 16X 18X 20(Scientific name
and numbers of
each organism)

(sandy area)

FLORA

Egregia
Iridaea
splendens

FLORA

Ulva
Iridaea
splendens
Porphyra
perforata
Gigartina
crustata
G. canaliculata
Spongomorpha
Phyllospadix

FLORA

Iridaea
splendens
Gigartina
canaliculata
G. crustata
Corallina
Phyllospadix

FLORA*

none

FLORA

Ralfsia
Pelvetia
Fucus
Gigartina
crustata
Endocladium

FAUNA

Pugettia
producta (2)

FAUNA

Tegula
funeralis (3)
Littorina
planaxis (640)

FAUNA

Acmaea
scabra (50)
Acmaea
digitalis (27)
Littorina
planaxis (740)
Balanus
glandula (270)
Idothea
rescecata (1)
Pagurus
samuelis (3)
Mopalia
lingnosa (2)

FAUNA

Tegula
funeralis (65)
Littorina
planaxis (200)

FAUNA

Mopalia
lingnosa (3)
Acmaea
scutum (15)
Acmaea
scabra (5)
Balanus
glandula (2500)
Littorina
planaxis (1000)
Thais
emarginata (75)
Anthopleura
elegantissima (40)

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970Specific Area Tide - .2 Time 8:48amRecorder Karin O'BrianBaseline Intervals TRANSECT NO. 2
metersX₁X₃X₅X₇X₉(Scientific name
and numbers of
each organism)

FLORA

Egrecia
Iridaea splendens
Microcladia
Corallina
Gigartina
canaliculata
Ulva
Phyllospadix

FLORA

Iridaea splendens
Egrecia
Corallina
Costaria costala
Phyllospadix
Gigartina
canaliculata
Odanthalia

FLORA

Egrecia
Costaria costala
Microcladia
Spongomorpha
Odanthalia
Gigartina
canaliculata
Ulva
Corallina
Desmarestia

FLORA

Costaria costala
Egrecia
Microcladia
Spongomorpha
Odanthalia

FLORA

Gigartina
canaliculata
Phyllospadix
Iridaea splendens
Ulva
Spongomorpha

FAUNA

Pagurus samuelis
(3)
Strongylocentrotus
pupuratus (2)
Leptasterias
aequalis (1)
Pycnogonum
stearnsi (2)

FAUNA

Haliotis rufescens
(3) to 6"
Leptasterias
aequalis (12)
Cryptochiton
stelleri (1)
Pycnogodia
helianthoides
(1)

FAUNA

Leptasterias
aequalis (10)
Pisaster
ochraceous (1)
Patiria miniata
(1)

FAUNA

Leptasterias
aequalis (7)
Pisaster
ochraceous (2)
Tegula brunnea
(3)
Epiactis
prolifera (1)
Strongylocentrotus
purpuratus (2)
Haliotis
(2) rufescens
Acmaea mitra
(3)
Cancer
antennarius
(2)

FAUNA

Haliotis rufescens
(1)- 3"
Parurus samuelis
(12)
Pugettia producta
(2)
Pycnogodia
helianthoides (1)

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970Specific Area Tide -.2 Time 8:48amBaseline Intervals
metersTRANSECT NO. 2Recorder Karin O'Brien

<u>X11</u>	<u>X13</u>	<u>X15</u>	<u>X17</u>	<u>X19</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Odonthalia</u> <u>Iridaea splendens</u> <u>Egrecia</u> <u>Ulva</u> <u>Corallina</u> <u>Gigartina</u> <u> cristata</u> <u>Microcladia</u> <u>Prionitis</u>	<u>Spongomorpha</u> <u>Gigartina</u> <u> canaliculata</u> <u>G. cristata</u> <u>Iridaea</u> <u> splendens</u> <u>Microcladia</u> <u>Prionitis</u>	<u>Gigartina</u> <u> cristata</u> <u>Egrecia</u> <u>Spongomorpha</u> <u>Iridaea</u> <u> splendens</u> <u>Odonthalia</u> <u> floccosa</u> <u>Gigartina</u> <u> canaliculata</u> <u>Ulva</u> <u>Ralfsia</u>	<u>Spongomorpha</u> <u>Iridaea</u> <u> splendens</u> <u>Gigartina</u> <u> canaliculata</u> <u>G. cristata</u> <u>Ralfsia</u> <u>Corallina</u>	none
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
<u>Pycnopodia</u> <u>helianthoides</u> (2) <u>Anthopleura</u> <u> xanthogrammica</u> (2) <u>Strongylocentrotus</u> <u> purpuratus</u> (1) <u>Patiria miniata</u> (2) <u>Epiactis</u> <u> prolifera</u> (26)	<u>Pycnopodia</u> <u>helianthoides</u> (1) <u>Cancer</u> <u> antennarius</u> (2) <u>Strongylocen-</u> <u> trotus</u> <u> purpuratus</u> (40) <u>Leptasterias</u> <u> aequilllis</u> (3)	<u>Cryptochiton</u> <u> stelleri</u> (2) <u>Pugettia</u> <u> producta</u> (1)	<u>Haliotis</u> <u> rufescens</u> (2) <u>Anthopleura</u> <u> xanthogrammica</u> (4)	none

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970Specific Area Tide -.2 Time 8:48amBaseline Intervals
metersTRANSECT NO. 3Recorder Kathi DeMasiX 1X 3X 5X 7X 9(Scientific name
and numbers of
each organism)

FLORA

Egregia
Ulva
Spongomorpha
Prionitis
Corallina
Gigartina
canaliculata

FLORA

Iridaea
splendens
Ulva
Gigartina
canaliculata
Corallina
Spongomorpha
Egregia

FLORA

Porphyra
Gigartina
canaliculata
Cladorpha

FLORA

Egregia
Ralfsia
Iridaea
splendens
Corallina
Ulva
Spongomorpha
Gigartina
cristata

FLORA

Ulva
Porphyra
Gigartina
canaliculata
Corallina
Rhabdodermella

FAUNA

Anthopleura
xanthogrammica
(1)
Anthopleuro
elegantissima
(1)
Patiria
miniata
(2)
Leptasterias (1)
Pagurus samuelis
(1)
Cryptochiton
stelleri (1)

FAUNA

Pisaster
ochraceous (2)
Clavelina
huntsmani (30)

FAUNA

Tegula
funeralis
(30)
Acmaea
elegantissima
(2)
Pisaster
ochraceous (1)
Thais emarginata
(1)
Thais iamellose
(3)
Littorina
scutulata (2)
Acmaea scabra
(2)
Crepidula
adunca (4)

FAUNA

Pisaster
ochraceous
(1)
Cryptochiton
stelleri (1)
Leptasterias
pusilla (1)
Patiria
minata (2)
Epiactis
prolifera (3)
Acmaea scabra
(2)
Crepidula
adunca (6)
Tegula
funeralis
(1)

FAUNA

Littorina
scutulata (16)
Mopalia
lingnosa (2)
Anthopleura
elegantissima
(7)
Obelia (1)
Tegula
funeralis (12)
Pagurus
samuelis (6)
Leptasterias
pusilla (3)
Clavalina
huntsmani (40)
Glycera americana
(1)

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970Specific Area Tide -.2 Time 8:48amBaseline Intervals
metersTRANSECT NO. 3Recorder Kathi DeMasi

<u>X11</u>	<u>X13</u>	<u>X15</u>	<u>X17</u>	<u>X19</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Ulva</u> <u>Porphyra perforata</u> <u>Gigartina</u> <u>canaliculata</u> <u>Corallina</u> <u>Egrecia</u> <u>Iridaea splendens</u> <u>Spongomorpha</u> <u>Phyllospadix</u>	<u>Egrecia</u> <u>Iridaea splendens</u> <u>Spongomorpha</u> <u>Phyllospadix</u> <u>Gigartina</u> <u>canaliculata</u>	<u>Gigartina</u> <u>canaliculata</u> <u>Iridaea splendens</u> <u>Porphyra perforata</u> <u>Ralfsia</u>	<u>Ulva</u> <u>Porphyra perforata</u> <u>Gigartina</u> <u>canaliculata</u> <u>Ralfsia</u> <u>Corallina</u>	<u>Porphyra perforata</u>
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
none	<u>Leucoselinia</u> <u>healthi</u>	<u>Balanus glandula</u> (40) <u>Anthopleura</u> <u>elegantissima</u> (4) <u>Acmaea scabra</u> (3) <u>Tegula funebris</u> (12)	<u>Hemigrapsus</u> <u>nudus</u> (1) <u>Acmaea scabra</u> (20)	<u>Littorina</u> <u>scutulata</u> (12) <u>Tegula funebris</u> (12)

INTERTIDAL SAMPLING : Location Chimney RockDate July 7, 1970

Specific Area _____

Tide -.2 Time 8:48amBaseline Intervals _____
metersTRANSECT NO. 4Recorder Kathi DeMasiX 1X 3X 5XX(Scientific name
and numbers of
each organism)

FLORA

Egregia
Spongomorpha
Phyllospadix

FLORA

Egregia
Spongomorpha
Phyllospadix

FLORA

Spongomorpha
Ulva
Egregia
Odenthalium
Gigartina
canaliculata
G. cristata
Ralfsia

FAUNA

Haliotis rufescens
(10) - 2"-6"

FAUNA

Strongloccentrotus
pupuratus (2)
Hinnites (2)

FAUNA

Cryptochiton
stelleri (2)
Patiria miniata
(2)
Tegula funebris
(1)

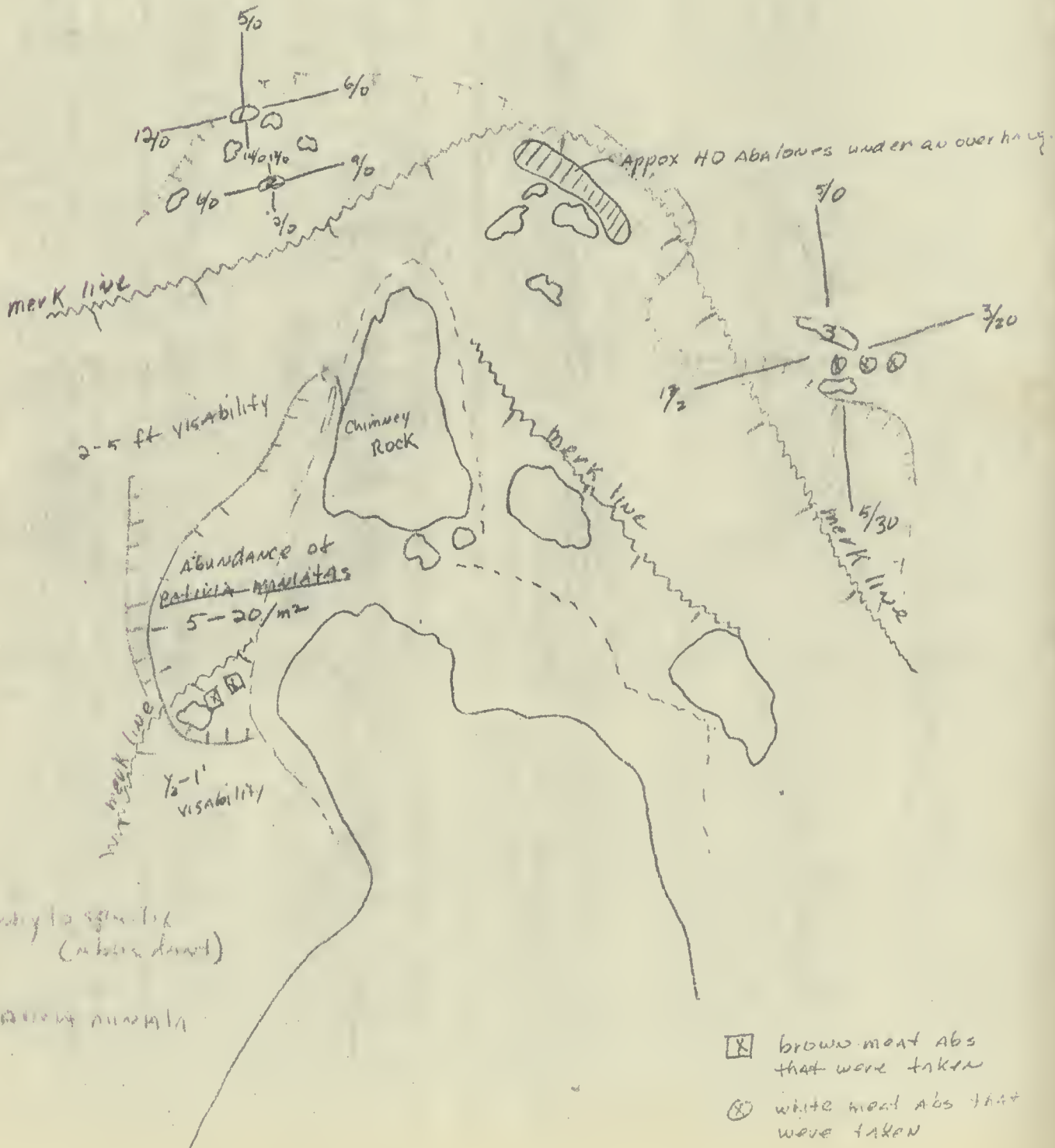
Chimney Rock.

CR-5,6,7 71

subtidal 8-1

N ←

5-9 ft visibility



f = phyto-sphere (subtidal)

f = Patella maculata

CHIMNEY ROCK TRANSECTS #1, #2, & #3
(Subtidal)

CR-ST-5, 6, 7
8-1



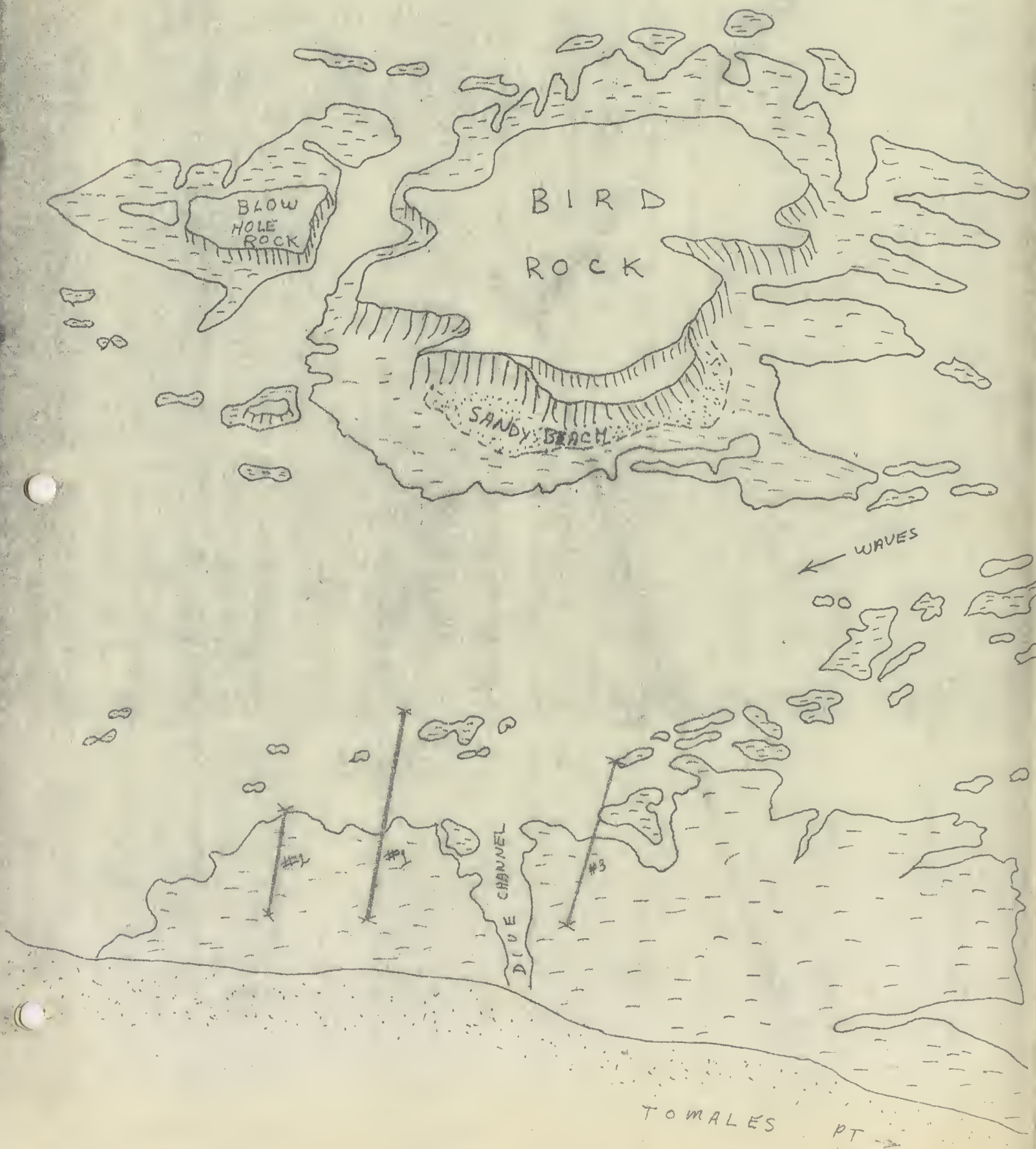
SCALE

Approx.
150 feet

Figure 1

BR-1, 2, 3

9-1, 2, 3



reading labels

DATA

Porifera

Leucosolenia eleanor
Aplysilla glacialis

Mollusca

Mytilus californianus
Acmaea scabra
Tegula funebris
Littorina planaxis
Thais emarginata
Littorina scutulata
Acmaea digitalis
Diodora aspera
Tonicella lineata
Hemidossena crassicornis
Mopalia lignosa
Acmaea limatula
Acmaea pelta
Margarites sp.

Arthropoda

Pollicipes polymerus
Balanus glandula
Idothea stenops
Pagurus hirsutiusculus
Pagurus samuelis
Pycnogonum stearnsi
Eugottia producta
Petrolisthes cinetipes
Cancer antennarius
Pachygrapsus crassipes
Tigriopus californicus

Echinodermata

Strongylocentrotus purpuratus
Cucumaria curata
Dermasterias imbricata
Patiria minata
Pisaster ochraceus

Coelenterata

Anthopleura xanthogrammica
Epiacthis prolifera

Chordata

Clavelina huntmani

# Sample	Total No. of specimens	\bar{x}	$\sum x_i^2$	$\sum x_i$	$\sum x_i^2$	S^2	S	95% C.I.
9	850	26.6	216,390	850	6,240	79.1	17.68	$17.68 \leq \mu \leq 53.968$
7	269	8.42	16,164	269	439	208	1.224	$1.224 \leq \mu \leq 7.196$
11	586	18.3	57,586	586	1,500	38.75	4.893	$4.893 \leq \mu \leq 31.707$
6	143	4.48	5,789	143	166	12.9	0.017	$0.017 \leq \mu \leq 8.943$
5	23	.718	163	23	4.73	2.09	-0.005	$-0.005 \leq \mu \leq 1.414$
1	5	0.156	25	5	.78	.884	.082	$.082 \leq \mu \leq .230$
3	46	1.44	798	46	23.6	4.86	.241	$.241 \leq \mu \leq 3.121$
1	1	.0313	1	1	.033	.1819	.031	$.031 \leq \mu \leq .093$
1	1	.0313	1	1	.033	.1819	.031	$.031 \leq \mu \leq .093$
1	1	.0313	1	1	.033	.1819	.031	$.031 \leq \mu \leq .093$
1	1	.0313	1	1	.033	.1819	.031	$.031 \leq \mu \leq .093$
1	2	.0626	4	2	.125	.884	.052	$.052 \leq \mu \leq .0731$
1	3	.0939	9	3	.286	.535	.049	$.049 \leq \mu \leq .1388$
1	1	.0313	1	1	.033	.1819	.031	$.031 \leq \mu \leq .093$
4	395	12.3	96,513	395	2,930	54.2	7.75	$7.75 \leq \mu \leq 16.85$
7	380	11.9	24,000	380	629	25.1	4.98	$4.98 \leq \mu \leq 14.01$
6	59	1.84	1,057	59	30.55	5.53	1.575	$1.575 \leq \mu \leq 2.305$
3	24	0.75	200	24	5.76	2.4	.55	$.55 \leq \mu \leq .95$
4	98	3.06	8,128	98	2.62	16.2	1.69	$1.69 \leq \mu \leq 4.42$
1	1	.0313	1	1	.033	.1819	.016	$.016 \leq \mu \leq .0465$
2	3	.0939	5	3	.152	.39	.0612	$.0612 \leq \mu \leq .1266$
2	401	439	1,960,001	60,178	1401	245	23.3	$23.3 \leq \mu \leq 64.5$
2	2	.0626	2	2	.0604	.246	.042	$.042 \leq \mu \leq .0832$
6	10	.0313	20	10	.0312	.1768	.0164	$.0164 \leq \mu \leq .0462$
1	1	.0313	1	1	.0312	.1768	.0164	$.0164 \leq \mu \leq .0462$
2	109	3.42	9,721	109	301	17.35	1.97	$1.97 \leq \mu \leq 4.87$
1	25	.78	625	25	195	4.42	.41	$.41 \leq \mu \leq 1.15$
2	3	.0939	5	3	.151	.389	.0613	$.0613 \leq \mu \leq .1265$
1	2	.0626	4	2	.125	.354	.0332	$.0332 \leq \mu \leq .092$
3	6	.1875	12	6	.350	.592	.1378	$.1378 \leq \mu \leq .2372$
10	819	25.7	146,104	819	4,022	63.4	20.39	$20.39 \leq \mu \leq 31.01$
1	5	.1561	25	5	.780	.884	.082	$.082 \leq \mu \leq .2302$
2	1 colony							

INTERTIDAL SAMPLING : Location Bird RockDate June 24, 1970Specific Area refer to fig.Tide -0.5 Time 10:18amBaseline Intervals _____
metersTRANSECT NO. 1Recorder Karin O'BrienX 1X 3X 5X 7X 9(Scientific name
and numbers of
each organism)

FLORA

Pelvetia
Corallina

FLORA

Gigartina cristata
Ralfsia

FLORA

Pelvetia
Gigartina crista.
Ralfsia

FLORA

Gigartina cristata
Ulva
Spongomorpha

FLORA

none

FAUNA

Mytilus
californianus
(10)
Acmaea scabra
(50)
Tegula funebris
(10)

FAUNA

Pollicipes
polymerus (80)
Mytilus
californianus
(200)
Acmaea scabra (95)
Littorina planaxis
(10)
Balanus glandula
(100)
Thais emarginata
(1)
Littorina
scutulata (5)

FAUNA

Tegula funebris
(26)
Acmaea scabra
(42)
Littorina planaxis
(40)
Idothea stenops
(1)
Anthopleura
xanthogrammica
(300)
Epiacthis
prolifera (5)

FAUNA

Anthopleura
xanthogrammica
(60)
Pagurus
hirsutiusculus
(10)

FAUNA

Pagurus samulis
(5)
Pagurus
hirsutiusculus
(8)

INTERTIDAL SAMPLING : Location Hrd RockDate June 24, 1970Specific Area refer to fig.Tide -0.5 Time 10:18amBaseline Intervals _____
metersTRANSECT NO. 1Recorder Karie O'Brien

<u>X₁₁</u>	<u>X₁₃</u>	<u>X₁₅</u>	<u>X₁₇</u>	<u>X₁₉</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Gigartina</u> <u>canaliculata</u> <u>Ulva</u> <u>Porphyra</u>	<u>Gigartina</u> <u>cristata</u> <u>G. californica</u> <u>Halosaccion</u>	<u>Iridaea splendens</u> <u>Corallina</u> <u>Gigartina</u> <u>cristata</u> <u>G. canaliculata</u> <u>Ralfsia</u> <u>Halosaccion</u> <u>Ulva</u>	<u>Ulva</u> <u>Halosaccion</u> <u>Iridaea</u> <u>splendens</u> <u>Egregia</u>	<u>Ulva</u> <u>Endocladia</u> <u>muricata</u> <u>Porphyra</u>
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
none	<u>Anthopleura</u> <u>xanthogrammica</u> (25) <u>Acmaea scabra</u> (50) <u>Tegula funebris</u> (10)	<u>Idothea stenops</u> (15) <u>Tegula funebris</u> (3) <u>Pycnogonum</u> <u>sternsi</u> (1) <u>Anthopleura</u> <u>xanthogrammica</u> (100)	<u>Anthopleura</u> <u>xanthogrammica</u> (7) <u>Anthopleura</u> <u>elegantissima</u> (50) <u>Mytilus</u> <u>californicus</u> (100) <u>Idothea</u> <u>stenops</u> (14) <u>Pugettia</u> <u>producta</u> (2)	<u>Petrolisthes</u> <u>cinctipes</u> (1400) <u>Pollicipes</u> <u>polymerus</u> (300) <u>Mytilus</u> <u>californicus</u> (400) <u>Strongylocentrotus</u> <u>pupuratus</u> (98) <u>Idothea stenops</u> (25) <u>Dermasterias</u> <u>imbricata</u> (2) <u>Tegula</u> <u>funebris</u> (70) <u>Anthopleura</u> <u>xanthogrammica</u> (200) <u>Cucumaria</u> <u>cucurata</u> (25)

INTERTIDAL SAMPLING : Location Bird RockDate June 24, 1970Specific Area refer toTide -.5 Time 10:18amBaseline Intervals _____
metersTRANSECT NO. 1Recorder K. O'Brien

<u>X 21</u>	<u>X 23</u>	<u>X 25</u>	<u>X 27</u>	<u>X 29</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Iridaea</u> <u>splendens</u> <u>Halosaccion</u> sp. <u>Ulva</u> sp. <u>Endocladium</u> <u>muricata</u>	<u>Phyllospadix</u> sp. <u>Corallina</u> sp. <u>Egregia</u> sp. <u>Iridaea</u> <u>splendens</u> <u>Endocladium</u> sp. <u>Ralfsia</u> sp. <u>Porphyra</u> sp. <u>Halosaccion</u> sp. <u>Callophyllis</u> sp.	<u>Halosaccion</u> sp. <u>Iridaea</u> <u>splendens</u> <u>Endocladium</u> <u>muricata</u> <u>Ulva</u>	<u>Phyllospadix</u> sp. <u>Iridaea</u> <u>splendens</u> <u>Gastroclonium</u> <u>coulteri</u>	<u>Iridaea</u> <u>splendens</u> <u>Porphyra</u> sp. <u>Phyllospadix</u> sp.
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
<u>Petrolisthes</u> <u>cinctipes</u> (1) <u>Idothea</u> <u>stenops</u> (1) <u>Plocamia</u> <u>karykina</u> (1 colony) <u>Leucosolenia</u> <u>eleanor</u> 1 (1 colony)	<u>Dermasterias</u> <u>umbricata</u> (1) <u>Anthopleura</u> <u>xanthogrammica</u> (34) <u>Diodora</u> <u>aspera</u> (1) <u>Toniacella</u> <u>lineata</u> (1) <u>Hermisenda</u> <u>crassicornis</u> (1) <u>Patiria</u> <u>miniata</u> (2)	<u>Clavelina</u> <u>huntsmani</u> (1 colony)	none	<u>Clavelina</u> <u>huntsmani</u> (1 colony)

INTERTIDAL SAMPLING : Location Bird RockDate June 24, 1970Specific Area refer toTide -.5 Time 10:18amBaseline Intervals _____
metersTRANSECT NO. 1Recorder Karie O'BrienX 31X 33

X _____

X _____

X _____

(Scientific name
and numbers of
each organism)

FLORA

Halosaccion sp.
Iridaea
splendens
Corallina sp.
Gigartina
canaliculata

FAUNA

none

FLORA

Iridaea
splendens
Gigartina
canaliculata
G. californica

INTERTIDAL SAMPLING : Location Bird RockDate June 24, 1970Specific Area refer toTide -0.5 Time 10:12amBaseline Intervals _____
metersTRANSECT NO. 2Recorder Karie O'Brien

<u>X 1</u>	<u>X 3</u>	<u>X 5</u>	<u>X 7</u>	<u>X 9</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Spongomorpha sp.</u> <u>Porphyra sp.</u> <u>Ralfsia sp.</u>	<u>Spongomorpha sp.</u> <u>Entermorpha</u> <u>compressa</u>	<u>Spongomorpha sp.</u> <u>Porphyra sp.</u>	<u>Iridaea</u> <u>splendens</u> <u>Phyllospadix sp.</u> <u>Porphyra sp.</u>	none
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
<u>Acmaea scabra</u> (15)	<u>Tegula funebris</u> (16) <u>Acmaea scabra</u> (10)	<u>Littorina</u> <u>planaxis</u> (5) <u>Acmaea digitalis</u> (10) <u>Acmaea scabra</u> (7) <u>Mopalia lignosa</u> (1) <u>Cancer antennarius</u> (1)	none	<u>Idothea stenops</u> (3) <u>Pagurus samuelis</u> (1)

Date june 24, 1970

Tide -0.5 Time 10:18am

Baseline Intervals TRANSECT NO. 3
 meters

X 1	X 3	X 5	X 7	X 9
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
none	none	none	none	<u>Pelutua sp.</u> <u>Gigartina sp.</u>
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
<u>Pachygrapsus</u> <u>crassipes</u> (1)	<u>Pachygrapsus</u> <u>crassipes</u> (1) <u>Tigriopus</u> <u>californicus</u> (1) <u>Balanus glandula</u> (20) <u>Littorina</u> <u>planaxis</u> (20) <u>Magarites sp.</u> (1)	<u>Littorina</u> <u>planaxis</u> (8) <u>Balanus glandula</u> (50)	<u>Tegula</u> <u>funnebris</u> (27) <u>Balanus glandula</u> (50)	<u>Pachygrapsus</u> <u>crassipes</u> (1) <u>Tegula funnebris</u> (140) <u>Mytilus</u> <u>californicus</u> (13) <u>Pagurus samuelis</u> (90) <u>Anthopleura</u> <u>xanthogrammica</u> (32)

INTERTIDAL SAMPLING : Location Hard RockDate June 24, 1970Specific Area refer toTide -0.5 Time 10:18amBaseline Intervals _____
metersTRANSECT NO. 3Recorder K. O'Brien

<u>X₁₁</u>	<u>X₁₃</u>	<u>X₁₅</u>	<u>X₁₇</u>	<u>X₁₉</u>
(Scientific name and numbers of each organism)				
FLORA	FLORA	FLORA	FLORA	FLORA
<u>Pelvetia sp.</u> <u>Gigartina</u> <u>cristata sp.</u> <u>Ralfsia sp.</u> <u>Cladophora sp.</u>	<u>Gigartina sp.</u> <u>Corallina sp.</u>	<u>Corallina sp.</u> <u>Gigartina sp.</u>	<u>Prioitis sp.</u> <u>Gigartina</u> <u>cristata</u> <u>G. canalicula</u> <u>Corallina sp.</u> <u>Cladophora sp.</u>	<u>Gigartina</u> <u>canalicula</u> <u>G. cristata</u>
FAUNA	FAUNA	FAUNA	FAUNA	FAUNA
<u>Tegula funebris</u> (70) <u>Pachygrapsus</u> <u>crassipes</u> (2) <u>Littorina</u> <u>planaxis</u> (60) <u>Thais emarginata</u> (4) <u>Mytilus</u> <u>californianus</u> (14) <u>Acmaea digitalis</u> (13)	<u>Tegula funebris</u> (150) <u>Pachygrapsus</u> <u>crassipes</u> (2) <u>Mytilus</u> <u>californicus</u> (5) <u>Pisaster</u> <u>x orchaus</u> (2) <u>Balanus</u> <u>glandula</u> (50)	<u>Anthopleura</u> <u>xanthogrammica</u> (6) <u>Pagurus samuelis</u> (2) <u>Tegula</u> <u>funebris</u> (64) <u>Strongylocentro-</u> <u>tus pupuratus</u> (11) <u>Pugettia</u> <u>producta</u> (1) <u>Pagurus</u> <u>hirsutiusculus</u> (6) <u>Mytilus</u> <u>californianus</u> (60) <u>Thais emargina-</u> <u>ta</u> (11) <u>Pollicipes</u> <u>polymerus</u> (7)	<u>Thais</u> <u>emarginata</u> (3) <u>Mytilus</u> <u>californianus</u> (48) <u>Pachygrapsus</u> <u>crassipes</u> (3) <u>Plaster</u> <u>orchaus</u> (2) <u>Balanus</u> <u>glandula</u> (60) <u>Acmaea</u> <u>digitalis</u> (23) <u>Pollicipes</u> <u>polymerus</u> (8)	<u>Cancer</u> <u>antennarius</u> (1) <u>Anthopleura</u> <u>xanthogrammica</u> (5) <u>Plaster</u> <u>orchaus</u> (2) <u>Balanus</u> <u>glandula</u> (50) <u>Acmaea pelta</u> (3) <u>Acmaea limitata</u> (2) <u>Thais emarginata</u> (4)

PT. REYES NATIONAL SEASHORE PARK

BR-ST-4
9-4

B I R D R O C K

Dr. G. Chan

-2 Tide, July 1961



9-4
BR-4

subtotal
p2.

Investigator _____

Year 1971 Date 8/6 Tide/Time _____ Water temp. _____ Other _____

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

[illegible]

TRANSECT WORKSHEET - G. Chan
January, 1971

BR-4
subtidal
p1

Study Site BIRD ROCK

Area _____ Section _____ Channel _____

Transect _____ Type _____

Other wash rock near

dive channel

Reference _____

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1970 Date 4/24 Tide/Time _____ Water temp. _____ Other _____

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm. (S=shells with oil)								
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
N		<u>alternately n²</u> <u>n=5 plots in each</u> <u>(1,3,5,7,9)</u>	12		(3,3,2,2,2)	3		(1,0,0,1,0)	3	2	2			
W		<u>(4,6,8,10,12)</u>	16		(7,5,3,0,1)	100		(5,7,8,17,63)						
S		<u>(1,3,5,7,9)</u>	4		(3,1,0,0,0)	173		(5,6,6,49,107)						
E		<u>n=5 plots</u> <u>(4,6,8,10,12)</u> <u>20 n²</u>	15 14		(7,3,2,1,1)	42		(2,5,3,5,27)						
			45			318								

Year 1971 Date 5/14 Tide/Time 0.8 Water temp. _____ Other _____

Plot #	Oil?	Species=	Organism Count			Size=Avg. mm. (S=shells with oil)								
			Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
N			3			5		red						
W		<u>fuel 10 m²</u> <u>counts for</u> <u>each direction</u>	5			38		red						
S			0			260		100 purple 160 red						
E		<u>40 m²</u>	2			25		red						
			10			328								

10-1
DP-1
p1

Reference _____
Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 7/27 Tide/Time 1.02 Water temp. Other

		Organism Count									Size=Avg. mm. (S=shells with oil)		
Plot #	Species= Oil? Algae, other	Abalones			Machinos								
		Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	N	0			0								
	E	3			0								
	S	1			0								
	W	4			0								

Year _____ Date _____ Tide/Time _____ Water temp. _____ Other _____

list all f_i counts

[illegible]

DP-2
p. 1

Study Site DOUBLE POINT

Area Section Channel

Transect Type subtidal

Other _____

Reference

Investigator _____

For the organism count of each species found, give total number alive and total number dead. If any shells have oil, give number with letter S in parentheses, e.g., (7S).

Year 1971 Date 7/27 Tide/Time 1.0 Q Water temp. Other

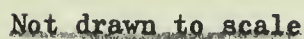
		9:12 AM			Organism Count			Size=Avg. mm.			(S=shells with oil)				
Plot #	Species=	<i>abalones</i>			<i>urchins</i>										
		Oil?	Algae, other	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size	Live	Dead	Size
	N			0				0							
	E			2				0							
	S			0				0							
	W			2				0							

Year Date Tide/Time Water temp. Other

list all x_i counts

[illegible]

SR-57-1
SR-57-2



Subtidal Transect No. 1

Approx.
300 ft.

3

COLLEGE OF MARIN

SUBTIDAL SAMPLING

Location Split Rock
 Sampling Area (See attached map pg. 3)
 Landmarks (See attached map pg. 3)

Date 11-7-71
 Tide 3.5 G.Gate
 Time 7:01 AM
 Recorder Stan Smith

Transect #	<u>1</u>	Red (R)
Direction	<u>N</u>	Purple (P)
Sample #		Abalone
		Urchin
1	0	0
Totals	0	0

Transect #	<u>1</u>	Red (R)
Direction	<u>S</u>	Purple (P)
Sample #		Abalone
		Urchin
1	0	0
	0	0

Transect #	<u>1</u>	Red (R)
Direction	<u>E</u>	Purple (P)
Sample #		Abalone
		Urchin
1	0	0
Totals	0	0

Transect #	<u>1</u>	Red (R)
Direction	<u>W</u>	Purple (P)
Sample #		Abalone
		Urchin
1	0	0
	0	0

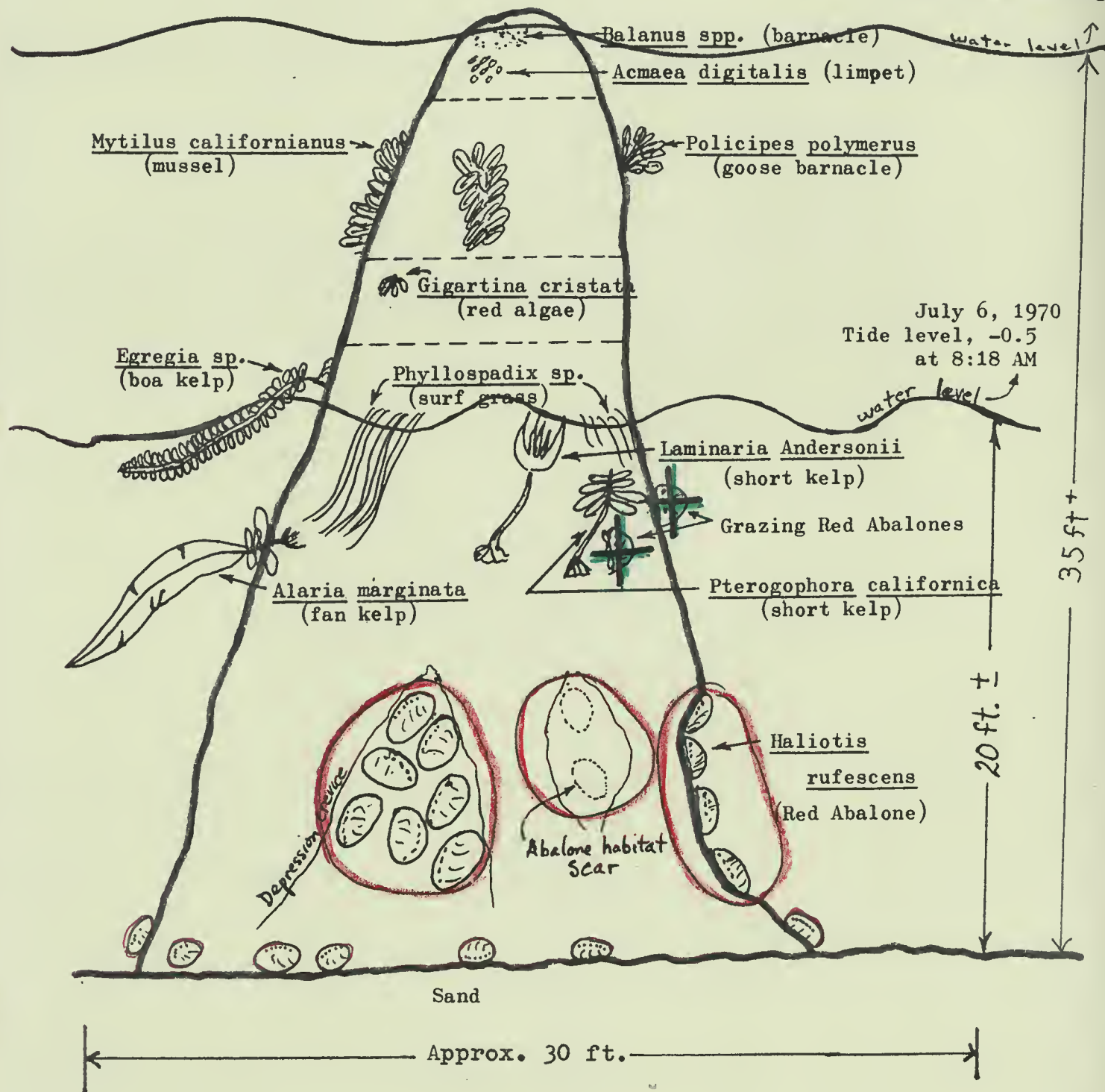
Comments and observations

During the winter months, as is now the case, the beach sand had moved out and covered any existing rocks that may have been there during the original transect taken by Dr. Chan. Sea State 0. The most exceptional day I have ever had as far as diving conditions are concerned. *5 or 6 abalones around base of rock, not in transects*

ZONATION OF ABALONES TO ALGAE, Rock Transect Site No. 2,
Split Rock, Pt. Reyes Park

(NOTE: This drawing was made in 1970. On 11-7-71, during our transect dive, I did not know from which side the drawing had been made. I assumed the north side due to similiarity in the rocks physical features. The red circles indicate locations of abs at this time. The green crosses show where abs were not seen at this time.)

Nov. 7, 1971
Tide 5.6
at 2:00 PM (high)



Pacific Ocean

N

Big Pipe Approx. 50 yds. →



Granitic Reef

Main
Flood
Channel

Granitic
Reef

Small Flood
Channel

Rocks seen only
at 0.0 tide or
lower

Red Abalone
abound here

Flood
Channel
Exposed at
-1.0 tide

Approx
20'

RED ABOLONE CENSUS Haliotis rufescens, Swainson, 1822

Reported by Dr. Chan, Stan Smith, Michael Biere, Andrea Nuessle,
Bill Sauber

Date
1/27/71

1/2/71

SEX	LOCALITY	LENGTH	NO. OF INNER GROWTH RINGS (+ or -)	COLOR OF MEAT
M	Big Pipe Reef	8"	12+	white
F	"	7 5/8 "	19+	"
M	"	7"	to scarred up to count	"
F	"	7 3/4"	10+	"
F	"	7 5/8"	13+	"

APPENDIX C

STATISTICS RECORD for _____

TRANSECT _____

Sample Size _____

(Location) _____

Transect Page _____

File Record
for SEASON/yr _____ / _____

Date _____

Field

Investigator _____

Tide/Time _____

Salinity _____

Stats Tech _____

SESSILE

MOBILE

ALL SPECIES
IN SAMPLESpecies
Codes _____1. $\sum x_i$ _____2. $\sum (x_i)^2$ _____

3. s.d. _____

4. \bar{X} _____5. 95% C.I. for
population
mean

to _____

to _____

to _____

Comments from
field worksheet _____
_____File Record
for SEASON/yr _____ / _____

Date _____

Field

Investigator _____

Tide/Time _____

Salinity _____

Stats Tech _____

SESSILE

MOBILE

ALL SPECIES
IN SAMPLESpecies
Codes _____1. $\sum x_i$ _____2. $\sum (x_i)^2$ _____

3. s.d. _____

4. \bar{X} _____5. 95% C.I. for
population
mean

to _____

to _____

to _____

Comments from
field worksheet _____
